THE INFORMATION CONTENT AND HEDGING PERFORMANCE OF FOREIGN CURRENCY TRANSLATIONS: AN EVALUATION OF SFAS NO. 8 VS. NO. 52

BY

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A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

1989

ACKNOWLEDGMENTS

First, I would like to express my deepest gratitude to my supervisor, Professor A. Rashad Abdel-khalik, who has led me to the excitement of academic research. Without his help and encouragement, I would never finish this project. I also want to thank Professors Bipin Ajinkya, Leonard Cheng, and Roy Crum for serving as my committee members and providing very useful comments.

Special thanks go to Professors Senyo Tse and Rodger Huang in reading earlier drafts and providing valuable comments. I am also grateful to the financial support provided by the Fisher School of Accounting during my dissertation stage.

Finally, I like to thank my parents for their understanding and sacrifice. Without their encouragement and support, I would never have the chance to finish my degree. To them, I am deeply indebted.

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THE INFORMATION CONTENT AND HEDGING PERFORMANCE OF FOREIGN CURRENCY TRANSLATIONS: AN EVALUATION OF SFAS NO. 8 AND NO. 52

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August, 1989

Chairman: A. Rashad Abdel-khalik
Major Department: Accounting

This study examines the regulation impacts of Statement of Financial Accounting Standards (SFAS) No. 8 and No. 52 from the perspectives of information content and hedging performance based on translation gains/losses provided by these two Statements.

Three major areas are explored in this study: (1) the time-series and cross-sectional relationship between firm value and its accounting exposure based on either SFAS No. 8 or No. 52; (2) the link between accounting exposure measured by either SFAS No. 8 or No. 52 and economic exposure measured by market information; and (3) the use of accounting information provided by SFAS No. 8 and SFAS No. 52 to improve the choice of hedge portfolios as an alternative evaluation criterion of accounting policies. The first issue concerns differential market reactions to foreign currency translations based on differential earnings quality. The evidence shows higher association between security price and the information provided by SFAS No. 8 than is the case with No. 52. This is consistent with the argument that translation gains/losses based on SFAS No. 8 provides cash flow implications to investors.

The second issue is to identify possible sources of potential cash flow implications from translation gains/losses. One possible source of cash flow implications is that translation gains/losses reflect the risks and benefits of foreign operations of multinational corporations. However, empirical evidence does not provide a positive link between economic and accounting exposure of multinational firms. Instead, a negative correlation between economic exposure and accounting exposure based on SFAS No. 8. was documented. This leads to the following issue.

The final issue concerns the hedging performance based on accounting information provided by SFAS No. 8 and No. 52. Hedging performance based on SFAS No. 8 was found to be statistically significant. This confirms previous evidence that, while translation gains/losses based on SFAS No. 8 provide no direct cash flow implication, the implication comes from managerial hedging accounting exposure at firm level instead of reflecting economic reality of foreign operations of multinational corporations.

CHAPTER 1
INTRODUCTION

The volatile exchange rates among nations and the increased level of U.S. investment overseas prompted the Financial Accounting Standards Board (FASB) to issue Statement of Financial Accounting Standards (SFAS) No. 8 in October 1975 as guidelines for the translation of foreign currency transactions and foreign currency financial statements. The controversy surrounding translation gains/losses due to volatile exchange rates, however, generated much debate in the financial and academic communities.

Some critics charged that SFAS No. 8 increased the volatility of earnings which was detrimental to multinational corporations (MNCs) and caused managers to engage in costly hedging to smooth earnings (e.g. see Burns (1976)). On the other hand, some researchers found no evidence that the stock market reacted negatively to the mandate of SFAS No. 8 (e.g. Dukes (1978) and Makin (1978)). The FASB finally issued SFAS No. 52 in December 1981 to replace the controversial SFAS No. 8. From the first issuance of Exposure Draft of SFAS No. 8 in late 1974 until late 1981 when SFAS No. 52 was finally issued, uncertainty continues to loom and tremendous resources have been spent on accounting policy deliberations about foreign currency translation.

Since the objective of financial reporting is to provide information that is useful in investment and credit decisions, it is important to evaluate the effects of accounting policies based on their usefulness to investors and creditors. This study examines not only the information content of SFAS No. 8 and No. 52, but also their potential usefulness to hedge against

investors/consumers' foreign exchange risk as one possible evaluation criterion of accounting policies. In addition, the potential of using accounting information for the purpose of hedging may also provide evidence of hedging accounting exposure by multinational firms.[1]

Recently, the U.S. dollar slid steeply in the foreign exchange market against other major currencies, especially the German mark and Japanese yen. Unanticipated exchange rate movements have become a fundamental feature of the international economic environment since the collapse of the Bretton Woods System, and increasing U.S. dependence on foreign goods augments the need for investors to protect themselves from an unanticipated declining dollar. One important issue is that whether financial reporting of foreign currency translation reflects the economic reality of multinational firms, which has largely been ignored during the deliberation of accounting for foreign currency translations.

Traditional capital market research in accounting considers the information content of certain events and infers the effects of accounting policies based on the market reactions to those events. This study takes a different approach from the information content method by examining how SFAS No. 8 and/or No. 52 might help improve individual investor's hedging performance. This approach not only provides a direct comparison of

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[1] If accounting exposure has no direct cash flow implications, an association between accounting exposure and real foreign exchange risk should not be observed. This also suggests that accounting translation information is not useful for hedging purpose. On the other hand, if an association between accounting exposure and foreign exchange risk is observed, this may provide evidence of hedging accounting exposure, which therefore has direct cash flow impact on multinational firms.

usefulness of information provided by either SFAS No. 8 or No. 52, but also has implications for hedging accounting exposure at the firm level.[2]

Modern finance theory has established the link between asset prices and the systematic influence of economic (or state) variables. The general conclusion of this theory is that an additional component of long-run return is required whenever a particular asset is influenced by systematic economic variables where no extra reward can be earned by bearing diversifiable risk (e.g. see Merton (1973), Long (1974), and Breeden (1979)). It can be shown that in a multiperiod setting, optimal investment behavior will generally involve holding portfolios that can be used to hedge against changes in certain relevant states of nature (see Bernard (1984)).

Research in accounting and finance has considered the possibility of constructing hedge portfolios against unanticipated changes in real GNP, aggregate consumption, and inflation (e.g. see Schipper and Thompson (1981), Gay and Manaster (1982), and Bernard (1984)). In a more recent study, Chen, Roll and Ross (1986) examined whether certain macroeconomic variables systematically affect stock returns, concluding that stock returns are exposed to systematic economic (or state) variables, and are priced in accordance with their exposure.[3]

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2 One major criticism of SFAS No. 8 was that management of multinational corporations was forced to hedge accounting exposure in order to smooth volatile earnings caused by translation gains/losses. This study provides some empirical evidence regarding this accusation.

3 Chen, Roll and Ross (1986) examined whether the following macroeconomic variables systematically affect stock market returns: the spread between long and short interest rates, expected and unexpected inflation, industrial production, and the spread between high and low grade bonds. They found that these sources of risk are significantly priced. They did not, however, find market portfolios, aggregate consumption and oil price risk are priced separately.

As an important macroeconomic variable affecting investment and consumption opportunities across countries, the extent to which foreign exchange exposure affects the pricing of financial assets is examined. If the financial assets that are priced according to exchange exposures can be identified, then they can be used to form hedge portfolios against unexpected exchange rate movements. Of particular interest to this study is the use of accounting information to measure exchange exposure and the use of common stocks of U.S. MNCs to form hedge portfolios against unexpected exchange rate movements. This application provides an alternative criterion in evaluating how SFAS No. 8 and No. 52 information is used in investment decisions.

This study explores (1) the time-series and cross-sectional relationship between firm value and its accounting exposure based on SFAS No. 8 and No. 52; (2) the link between accounting exposure measured by either SFAS No. 8 or No. 52 and economic exposure measured by market information; and (3) the use of accounting information provided by SFAS No. 8 and SFAS No. 52 to improve the choice of hedge portfolios as an alternative evaluating criterion for accounting policies.

The major contribution of this study is three-fold. First, compared with previous studies of foreign currency translations, a more powerful research design and empirical tests based on a theoretical model are provided to detect differential market reactions to information provided by SFAS No. 8 and No. 52. Second, possible cash flow implications of accounting information provided by SFAS No. 8 and No. 52 are considered to substantiate the information content documented in the first part of the study. Finally, hedging performance based on accounting information not only suggest the potential usefulness of accounting information, but also has implications of hedging accounting exposure at the firm level, which provides an alternative explanation of the

information content of foreign currency translations documented in the first part.

In the following chapter, a review of exchange rate determination and accounting research in foreign currency translations will provide the background and motivation for this study. Chapter 3 proposes a more powerful research design in detecting stock market reactions to information provided by SFAS No. 8 and No. 52. Also, possible explanations of information content of foreign currency translations are considered in another design. Empirical results and discussion are reported in Chapter 4. A different approach which examines the usefulness of market and accounting information in hedging foreign risk is discussed in Chapter 5, which also reports empirical results. A brief conclusion and suggestions for possible extension will close this study.

CHAPTER 2
LITERATURE REVIEW

In this chapter, I review the literature in exchange rate determination with its implications for accounting translations presented in sections that follow. Accounting regulations on U.S. multinational corporations are discussed in section 2.2, which highlights the controversies of foreign currency translation. Accounting research in capital market reactions to SFAS No. 8 and No. 52 is summarized in section 2.3. A critical evaluation of current research in the last section provides the motivation for the research design that is proposed in the subsequent chapter.

2.1 Theory of Exchange Rate Determination

Two major key questions in foreign currency accounting area are (1) which exchange rate should be used in translation of foreign assets and liabilities? and (2) how should unrealized translation gains/losses be recognized?

While most discussion of SFAS No. 8 and No. 52 centers around the second issue, it is essential to understand the nature of exchange rate before we can evaluate any foreign currency accounting issues. In this section I intend to review what we have known so far about exchange rate and how this economic variable affects individuals through consumption.

The 1970s witnessed a dramatic transformation of the international monetary system from a regime of pegged exchange rates into a regime of

floating exchange rates. Frenkel (1981) concludes that the high volatility of exchange rates reflects an intrinsic characteristic of the relative price of monies and other assets that are traded in organized exchange, and that the value of exchange rates depends on expectations concerning the future course of events, and the speed at which they adjust to new information. Specifically, exchange rates can be viewed as financial variables which are determined in a macroeconomic setting. Frenkel's interpretation of exchange rates is in contrast with traditional views of exchange rate determination based on balance of payments and purchasing power parity.

2.1.1 Purchasing Power Parity

The basic idea of purchasing power parity (PPP) is that different currencies representing the same monetary value should have identical purchasing power over goods and services. The exchange rate adjusts to keep purchasing power constant across different countries, i.e. change in the exchange rate=relative change of inflation rate across countries. This adjustment will occur through commodity or currency arbitrage.

A justification for purchasing power parity is that if a country experiences a higher inflation rate than its main trading partners, its export of goods and services will become less competitive with comparable products produced elsewhere. Imports from abroad will also become more price competitive with higher-priced domestic products. Thus the country with the relatively high inflation rate will develop a deficit in its balance of payments for trade in goods and services. If this deficit is not offset in the capital account, it will lead to a downward pressure on the country's spot exchange rate because demand for foreign currency to import goods and services will be greater than other countries' demand for the country's currency for the same

purpose. Also, an increased supply of relatively inexpensive imports should help reduce price inflation. Thus purchasing power parity theory is posited to work on both the spot exchange rate and the relative price levels so as to restore equilibrium in the balance of payments.

Several empirical studies provide tests for the theory of purchasing power parity. The general conclusion has been that the theory holds up well over the long run but not as well for shorter time periods. Despite all the limitations of those studies, there is a proportional relationship over the long run between spot exchange rates and relative rates of inflation.

2.1.2 Rational Expectations and Asset View of Exchange Rate Determination

The explanation of long-run exchange rate behavior is purchasing power parity, or the law of one real price at any time applied to the prices of tradeable goods. However, we do observe exchange rates deviating from rates which would be predicted by purchasing power parity, especially in the short run. For one thing, government intervention can cause some deviation. Even in the absence of government intervention, we would expect to see transient variations of spot exchange rates from the parity levels, because the law of one real price at any time can operate only over time, not instantaneously.

It is important to recognize that recent theoretical developments, particularly the asset view of exchange rate determination and rational expectations, suggest a structure and a clearly defined and measurable set of exogenous variables for the determination of exchange rates. One of the central implications of the rational expectations hypothesis is that unanticipated events play a predominant role in affecting real variables and asset yields.

Frenkel (1981) expressed the spot exchange rate at period t as a function of factors which have been known in advance and are summarized by the lagged forward rate, as well as a function of the "news":

$$LnS_t = a + b\ LnF_{t-1} + c\ \text{"news"} + w_t$$

LnS_t: natural log of spot rate at period t,

LnF_{t-1}: natural log of forward rate at period t-1,

w_t: error term.

The lagged forward rate can be regarded as the expected spot rate at period t, and Frenkel used the unexpected interest differential as the surrogate of news concerning inflationary expectations. Using three exchange rates over the period June 1973-July 1979, Frenkel was able to show that the coefficients of unexpected interest differential were statistically significant. Applying the same idea that unanticipated changes in exchange rates are primarily due to innovations of relevant macroeconomic (or state) variables, Harris (1983) proposed to examine other "news" components (e.g. unexpected inflation, unanticipated monetary growth, government intervention, etc.) which may explain changes in exchange rates.

Based on previous studies in international economics and finance, we can assume changes in the exchange rate are described by three components: inflation differential, interest rate differential, and real exchange rate changes. The change of the exchange rate between these two countries can be expressed as follows, assuming these variables are following stochastic processes and for simplicity, the second order interaction terms are omitted:

$$\frac{de}{e} = \frac{d\left(\frac{P}{P^*} \times \frac{i}{i^*} \times u\right)}{\frac{P}{P^*} \times \frac{i}{i^*} \times u} = \left(\frac{dP}{P} - \frac{dP^*}{P^*}\right) + \left(\frac{di}{i} - \frac{di^*}{i^*}\right) + \frac{du}{u}$$

d: total differentiation,

e: nominal exchange rate between these two countries,

P: inflation rate in home country,

P*: inflation rate in foreign country,

i: real interest rate in home country,

i*: real interest rate in foreign country,

u: real exchange rate (reflecting deviations from purchasing power parity and interest rate parity).

An intuitive explanation of the exchange rate changes is that their movements are due to (1) purchasing power parity, (2) interest rate parity, and (3) government intervention and structural changes. It is important to decompose exchange rate changes into those three different components because only changes due to interest rate and inflation differentials have economic meaning on accounting exposure according to Beaver and Wolfson (1982 and 1984), i.e. only translation gains and losses due to interest rate and inflation differentials should be considered as part of earnings in interpreting foreign transactions.[4]

Although the above model provides us with a much better understanding of exchange rate determination, it does not help us in better predicting exchange rates. Exchange rates are set by a combination of market

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4 Beaver and Wolfson (1982) assume exchange rate is determined by purchasing power parity in their model. In their later study, they assume exchange rate is determined by interest rate parity. Therefore, their conclusion that translation gains/losses have economic meaning is based on their assumptions of exchange rate determination.

forces and government intervention under the current floating system and the observed structural changes may be due to alteration in government policies. As long as there is a possibility of unanticipated changes in macroeconomic variables, there will be unanticipated changes in exchange rates, and exchange risk due to unanticipated exchange rate movements will exist as well. While accounting critics have blamed SFAS No. 8 as the cause of volatile earnings, translation gains/losses reflect only the volatile nature of exchange rates and might serve to remind managers of the importance of foreign exchange risk management. The more critical issue is whether financial reporting of translation gains/losses reflect the inherent risks and benefits of foreign operations of multinational firms due to the volatile nature of exchange rates.

2.2 Accounting Regulations for U.S. MNCs

Due to the expansion of international business activities and extensive currency realignments that followed the adoption of a floating exchange rates regime by the international monetary authorities, Financial Accounting Standards Board (FASB) issued SFAS No. 8 in October, 1975 to establish standards of financial accounting and reporting for foreign currency transactions and translating foreign currency financial statements.

SFAS No. 8 requires the following for foreign currency translation:

1. Monetary assets and liabilities denominated in foreign currencies shall be translated in terms of current exchange rates, while nonmonetary assets and liabilities are to be translated in terms of historical exchange rates.

2. Translation gains and losses shall be included in determining net income for the period in which the current rates change.

The most controversial issue of SFAS No. 8 centers around the second point, translation gains and losses being included as part of net income. Due to the frequent and volatile movement of exchange rates, translation gains and losses caused earnings of MNCs to be more volatile than those of domestic firms. Critics have accused MNCs of engaging in costly hedging activities to smooth accounting income while ignoring the economic reality (e.g. see Burns (1976)). Evans, Folks and Jilling (1978) have also concluded that SFAS No. 8 changed the foreign exchange risk management practice of U.S. MNCs. Ziebart and Kim (1987) found an overall negative stock price reaction to SFAS No. 8, which is consistent with the above argument.

In response to the public criticism of SFAS No. 8, the FASB issued SFAS No. 52 in December, 1981 to replace SFAS No. 8. There are two major changes in SFAS No. 52 from No. 8:

1. A new concept of functional currency was introduced. The current exchange rate is used for the translation of financial statements of foreign subsidiaries if local currency has been selected as the functional currency.[5]

2. Translation gains and losses from functional currency to reporting currency no longer flow through the income statement, instead, an equity account accumulating translation gains and losses is created.

The current exchange rate for translation of financial statements, required under SFAS No. 52, has redefined the accounting exposure as the entire owners' equity section, which is in contrast with using net monetary

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5 If U.S. dollar is chosen as the functional currency, the translation gains and losses from foreign currencies to U.S. dollar still go to the income statement, which is exactly the same as the requirement of SFAS No. 8. FASB provides some guidelines in choosing the functional currency, but requires U.S. dollar be the functional currency under certain circumstances.

position as in SFAS No. 8.[6] While some accounting researchers argue that the use of SFAS No. 52 current rates for translation does not provide theoretically justified income measurement and asset valuation (e.g., see Ijiri (1981) and Beaver and Wolfson (1982, 1984)), SFAS No. 52 received little criticism from the public, presumably because its effect on the volatility of the earnings of MNCs is less than SFAS No. 8.[7]

Economic exposure focuses the total effects of exchange rate fluctuations on changes in selling prices, costs, and demand. Further, it argues that reliance on accounting exposure may distort the diversification potential of particular foreign equities and may even lead corporate financial managers to follow hedging strategies that increase rather than reduce exchange risks. While theoretically appealing, the concept of economic exposure does not provide any precise definition for foreign currency management, nor does it afford a practical means for measurement. Furthermore, there is evidence that financial managers continue to use accounting exposure as guidance in foreign exchange management even after SFAS No. 52 replaced SFAS No. 8.[8]

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6 Ayres (1986a) correctly pointed out that it is difficult to compare the translation gains and losses under SFAS No. 8 and under SFAS No. 52 due to different accounting exposures and the discretionary choice of functional currency. In this study, when SFAS No. 52 is compared to No. 8, it only considers firms choosing local foreign currency as their functional currency since firms choosing U.S. dollar as their functional currency are still following the guidance of SFAS No. 8.

7 Ziebart and Kim (1987) also found a positive stock price reaction to the adoption of SFAS No. 52.

8 Business International Corporation (1982) reported that most MNCs interviewed defined their foreign exchange exposure based on their accounting exposure even after the adoption of SFAS No. 52.

2.3 Accounting Research in Foreign Currency Translation

Research questions related to foreign currency translations can be broadly classified into two basic categories: 1. valuation of foreign subsidiaries, and 2. disclosure of foreign currency translation adjustments. While the first category deals with the choice of the exchange rate used for translation of foreign assets and liabilities, the second one considers the form of disclosure of foreign currency translation adjustments, and their impacts on capital market and managerial behavior.

2.3.1 Measurement Issue of Foreign Currency Translation

Several studies consider the alternative translation methods for financial reporting purpose. Aliber and Stickney (1975) examined two commonly used translation methods, the current/noncurrent method and the monetary/nonmonetary method. Their empirical results suggest significant deviations from the theoretical relationship based on the assumption of purchasing power parity, and they concluded that the implicit assumptions of these two methods are both logically inconsistent and empirically unjustifiable.

Beaver and Wolfson (1982) used the properties of economic interpretability and symmetry to evaluate three different translation methods: current cost at current rates (C/C), historical cost at historic rates (H/H), and historic cost at current rates (H/C). The authors assumed purchasing power parity, interest rate parity, and a perfect and complete market. They concluded that only C/C method preserves both economic interpretability and symmetry. H/H method displays only symmetry, and H/C method preserves neither. The critical part for C/C method to preserve economic

interpretability is to include translation gains/losses in income. While their analysis provides insight of different translation methods, a direct test of their model is difficult because most current translation methods are hybrid methods (a combination of either C/C and H/C or all three). Also, the impact of relaxing the assumption of purchasing power parity and interest rate parity is unknown.

Assuming purchasing power parity does not hold, Harris (1983) examined alternative exchange ratio for translation purpose. He concluded that no single measure of relative price ratio will provide a translation which is consistent and free of measurement error.

Previous studies on evaluating alternative translation methods can only lead to the conclusion that translation is a practical problem but no single translation method can satisfy all theoretical assumptions and evaluation criterion. While the choice of the appropriate translation method for valuation purpose continues to be an important issue, most researchers have focused their attention on the disclosure of translation gains/losses, and their effects on stock market reactions and managerial behavior.

2.3.2 Impact of SFAS No. 8 and No. 52 on Capital Market Reactions and Managerial Behavior

In response to the negative reaction to the issuance of SFAS No. 8, several studies (e.g. Dukes (1978) and Makin (1978)) considered the possible economic consequences of SFAS No. 8 on multinational firms by examining their stock returns during affected periods. While using different research designs, both concluded no significant negative market reaction to SFAS No. 8.

More recently, Ziebart and Kim (1987) evaluated market reactions associated with both SFAS No. 8 and No. 52 using a different methodology.

Based on their analysis, they concluded that there had been a negative market reaction to the issuance of SFAS No. 8. They also concluded that the market had reacted positively to the issuance of the first exposure draft of SFAS No. 52. While their results are contrary to previous findings, they provided no explanation for the specific market reactions they reported. Also, their analysis was based on raw returns which may incorporate other confounding events.

Tse (1988) extends Ziebart and Kim (1987) by using an alternative methodology which considers extra-market security price influences (exchange rates and interest rates) other than the regulation events, and he concludes that extra-market factors may alter inferences on price reactions to accounting events which affect firms simultaneously. This points to the need of making a careful interpretation of previous studies, especially when there is a lack of control of these extra-market factors.

Since the FASB provided a transition period for firms to adopt SFAS No. 52, most firms had the option of adopting No. 52 during either 1981, 1982, or 1983 fiscal year. Ayres (1986b) found that firms which adopted SFAS No. 52 during 1981 are smaller in size, showed an increase in earnings in the adoption year, directors and managers had lower stock holdings, and a more binding constraint on dividend payout than late adopters. In another study, Brown and Brandi (1986) examined cumulative stock returns of early and late adopters of SFAS No. 8 and No. 52, and found a significant difference between these two groups. They concluded that there had been a strong market reaction to a firm's decision to adopt the new standard in 1981, and attributed their observation to market inefficiency. Once again, their study did not control other confounding events and the possible self-selection bias observed by Ayres (1986b).

Several other studies (e.g. Kelly (1985), and Griffin (1982, 1983)) also examined characteristics of firms lobbying SFAS No. 8 and No. 52. While these studies formulate their hypotheses based on agency theory, the results are either contrary to expectations or conflicting with each other. While this branch of research is intended to explain why issuance or adoption of a new accounting standard may lead to potentially different managerial behavior, a lack of rigorous theory and available data has prevented further progress in this area.

2.4 A Critical Evaluation of Research in SFAS No. 8 and No. 52

Studies examining the impact of SFAS No. 8 and No. 52 on firm value generally have provided weak economic motivation as to why multinational firms would either suffer or benefit from the adoption of a new accounting standard. Ziebart and Kim (1987), for example, argued that firms which used a translation method other than temporal method would react negatively to the adoption of SFAS No. 8. However, they did not explain why such an effect should be expected because of a new accounting standard.

In order to justify a particular partitioning of sample firms, it is necessary to identify the economic impact of a change in accounting practices. Since there were no direct tax-related cash flow consequences of SFAS No. 8, the economic impact, if any, should come from either the costs of changing accounting practices or from the secondary effects of accounting variables to real decisions and the contracting costs. Any costs of changing accounting practices are probably too small to detect, given the high variability in stock prices. The secondary effects from real decisions, however, are not unambiguously negative across affected firms because the

effects of SFAS No. 8 would be firm specific. This may explain why most studies examining stock market reactions to SFAS No. 8 and No. 52 found either no result or conflicting results even with careful control for other confounding events or factors. Also, this argument pinpoints the limitation of traditional event studies in detecting firm-specific effects of accounting regulations.

Based on the above analysis, an economic model which provides predictions of a differential impact across firms should guide the research design and empirical tests. In order to increase the power of empirical tests, firm specific predictions should be explored instead of predictions of average effect. Corporate lobbying behavior provides an alternative approach in examining the potential effects of accounting regulations. However, due to the lack of theory and data, progress in this area has not been observed.

In summary, the economic motivation for the current event studies is insufficient to predict average effect, let alone discriminating between competing hypotheses. This is especially true when estimation error is a serious problem such as foreign currency translation. The following three chapters will provide a more powerful research design under the guidance of a theoretical model in detecting market reactions and managerial behavioral changes due to SFAS No. 8 and No. 52.

CHAPTER 3
DIFFERENTIAL INFORMATION CONTENT OF FOREIGN CURRENCY TRANSLATIONS AND THEIR CASH FLOW IMPLICATIONS

3.1 Introduction

Unanticipated exchange rate movements are a fundamental feature of the international economic environment, especially with floating rates. Such movements constitute a source of risk for multinational firms, and can affect actions taken by decision makers within those organizations. A similar concept applies to individuals in their roles as consumers of imported goods and investors in internationally traded securities, which will be addressed in Chapter 5.

However, views on the notion of exposure to exchange rate movements (or exchange risk) have differed markedly. One extreme view is that all foreign asset or liability positions are completely exposed. At the other extreme, Grauer, Litzenberger, and Stehle (1976) argue that in the absence of market imperfections, there is no real exchange risk. The first view of foreign exchange exposure assumes that both domestic and foreign price changes are completely unrelated to exchange rate movements, while the second view implicitly assumes perfectly flexible prices (or market neutrality as suggested by Glick (1986)) and no trade barriers. By implication, a critical aspect of foreign exposure is the relationship between prices and exchange rates. Hodder (1982) recognized this aspect and developed a model of exposure which describes price movements in both countries to accompany a change in

the exchange rate between these countries. The implication of Hodder's model is that the domestic portion of a multinational as well as another purely domestic firm may be exposed to exchange rate movements.[9]

Hodder's model also points out that the differences between economic and accounting exposure are due to their implicit assumptions about the relationship between prices and exchange rates. While Beaver and Wolfson (1982) did not distinguish the differences between economic and accounting exposure, their model does assume perfect relationship between prices and exchange rate (i.e. Purchasing Power Parity) and that the market is perfect and complete. Therefore, it is not surprising that they reach the conclusion that translation gains/losses should be included in net income in order to preserve symmetry and economic interpretability because translation gains/losses in their model can be interpreted as part of economic exposure. Due to the valuation rules in accounting practice, whether accounting translation gains/losses have market valuation implications may depend on which translation method is being used as well as the relationship between prices and exchange rates.[10] In the next section, the information content of earnings and translation gains/losses under SFAS No. 8 and No. 52 will be discussed and examined from three different perspectives. Then, a formal model of differential information content of earnings proposed by Choi (1985)

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9 While this suggests that all firms are subject to exchange exposure, this study is more interested in that how the behavior of MNCs is changed by accounting exposure.

10 Beaver and Wolfson (1982) consider only translation methods while holding the relationship between prices and exchange rates constant. Their conclusion may be altered under different assumptions. This also explains why it is difficult to empirically test their proposition.

will be introduced in section 3.3. Testable hypotheses and research designs are presented in the following three sections.

3.2 Evaluation of SFAS No. 8 and No. 52

The puzzle of foreign currency translation is that while almost everyone in the financial community had something negative to say about the temporal method and SFAS No. 8, so far only limited direct evidence of detrimental effects of SFAS No. 8 has been presented (e.g. see Griffin (1982)). While accounting information is useful only to the extent that it reflects the economic reality of the enterprise, in reality few people can neglect the accounting consequences of their decisions, which are argued by Ijiri (1983) as only a surrogate for economic reality, because no one can comprehend the economic reality with certainty. Consider the possible situations where accounting variables are affecting decisions such as employee profit-sharing plans, debt covenants, cost-plus contracts, etc., it can be understood why foreign currency accounting is such a serious issue among multinational corporations. And the managers' desire to smooth income so as to minimize accounting risk arising out of foreign exchange activities may also be evaluated in the proper perspective. Griffin (1982) provides limited evidence that firms which submitted comments on SFAS No. 8 to the FASB exhibited greater swings in pretax earnings due to foreign currency translation than did other multinational firms that did not submit comments. From the theoretical framework of foreign currency translation suggested by Beaver and Wolfson (1982) and Glick (1986), foreign currency translation under either temporal method (required by SFAS No. 8) or current rate method (required by SFAS No. 52) is deficient because both translation methods are

hybrid of historical cost and current value accounting models with different translation rates. As many have argued, the accounting exposures based on temporal method usually do not reflect the underlying economic reality of the reporting firm. It can also be argued that accounting translation gains/losses are transitory components of earnings which may not reflect the potential exchange risks facing multinational firms.

Previous research in foreign currency area only considers stock market reactions to the deliberation and issuance of SFAS No. 8 and No. 52 without any reasonable underlying theory (see Thompson (1986)). For example, most studies assume SFAS No. 8 is detrimental to MNCs, while SFAS No. 52 is a relief to MNCs. However, only limited evidence supports this argument. The adoption of SFAS No. 52 not only changes translation from temporal method to current rate method but also allows translation effects to bypass the income statement for most multinational firms. If translation gains/losses are transitory components of earnings, it may be argued that the quality of earnings under SFAS No. 8 is noisier than (or inferior to) that under SFAS No. 52. Therefore, the introduction of SFAS No. 52 provides the opportunity to compare the differential reactions of multinational firms and capital market to accounting policy changes of this controversial issue.

In this study, information provided by SFAS No. 8 and No. 52 will be evaluated from three different aspects with a direct link to some firm-specific variables. First, a comparison of overall earnings quality under different translation methods will be conducted based on a theoretical model of differential information content. Second, the relationship between stock returns and translation adjustments will be studied. While translation adjustments may be transitory, they may still have valuation implications for two reasons: One is that translation information may be a surrogate of future

foreign cash flows. The other is that translation information disclosure may have changed managerial real decisions which have direct cash flow impacts, for example, costs of hedging accounting exposure when SFAS No. 8 was in effect. Finally, translation adjustments will be correlated with surrogates of risks and benefits of foreign operations to examine whether accounting translation reflects the foreign cash flow impacts and economic reality of multinational firms. This three-part study not only helps understand the role of accounting translation in firm valuation, but also provides a chance to evaluate SFAS No. 8 and No. 52 from different perspectives with more powerful research designs.

3.3 Theoretical Model of Differential Information Content of Earnings

In this section, a theoretical model is presented to identify the possible differential market reactions to information provided by SFAS No. 8 and No. 52. Developed by Choi (1985), the theoretical model describes differential information content of publicly announced earnings.[11] The general proposition of the model is as follows: The information content of firm j's earnings is (1) positively correlated with the uncertainty of its production and investment activities (σ^2), and (2) negatively correlated with the noise of the firm's reporting process (ϕ^2).

As discussed before, the major criticism of SFAS No. 8 is the volatile nature of translation gains/losses which are included in earnings. Due to the

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11 Collins and Kothari (1987) provide a different approach addressing the same issue. Basically, Collins and Kothari (1987) focus on the impacts of macro variables on earnings, while Choi (1985) focuses on firm-specific variables which affect earnings.

fact that financial statements are published only four times a year, translation gains/losses can be viewed as temporary components of earnings which may not provide any long-term valuation implication. SFAS No. 52, on the other hand, allows firms choosing local foreign currency as functional currency to channel translation gains/losses directly into owners' equity. If translation gains/losses were perceived by the market as temporary components of earnings, we would expect stronger association between stock returns and earnings based on No. 52 than the association based on No. 8.

Choi (1985) describes a model of differential information content with the following assumptions:

1. The financial market is perfectly competitive and has n firms and m investors.

2. Investors have the same one-period planning horizon over which they maximize the expected utility of wealth.

3. Firms are assumed to exist indefinitely with periodic earnings $\tilde{x}_j$ for firm j (j = 1, n).

4. Each firm j measures x_j (realization of $\tilde{x}_j$) each period, and announces publicly the measured earnings y_j.

5. Investors perceive y_j as the realization of a random variable $\tilde{y}_j$ which communicates the outcome $\tilde{x}_j = x_j$ with some bias δ_j and noise $\tilde{e}_j$ as the following:

$$\tilde{y}_j = \tilde{x}_j + \delta_j + \tilde{e}_j$$

where $\tilde{e}_j$ is a normal random variable with zero mean and variance ϕ^2.

6. Prior to the announcement of any y_j, investors' homogeneous beliefs about y_j are represented by a multivariate normal distribution with means u_j, variances σ_j, and covariances σ_{jk}.

Based on the above assumptions, the price of firm j prior to earnings announcement is simply the capitalized amount of the difference between the expected earnings and the correction term for risk, and can be described as follows:

$$p_j = (1/r)\{E(\tilde{\pi}_j) - \lambda[Var(\tilde{\pi}_j) + \sum_{k,k\neq j} Cov(\tilde{\pi}_j,\tilde{\pi}_k)]\} = (1/r)[\mu_j - \lambda(\sigma_j^2 + \sigma_{j,M-j})]$$

On the other hand, the posterior price of firm j after announcing earnings can be described as follows based on assumption of returns normal distribution:

$$p_j(y_j) = (1/r)[\mu_j + \sigma_j^2(y_j - \delta_j)/(\sigma_j^2 + \phi_j^2) - \lambda(\sigma_j^2\phi_j^2 + \sigma_{j,M-j}\phi_j^2)/(\sigma_j^2 + \phi_j^2)]$$

Since the earnings signal y_j is the only conditioning variable which causes the posterior price to be different from the prior price, the price change due to the earnings announcement is simply the difference between the two prices. Therefore, the price change for the announced firm j $dp_j(y_j)$ is given by the following:

$$dp_j(y_j) = \alpha_j + \beta_j[(y_j - \delta_j - \mu_j)/r]$$

where $\beta_j \equiv \sigma_j^2/(\sigma_j^2 + \phi_j^2), 0 \le \beta_j \le 1$

$$\alpha_j \equiv \lambda(\sigma_j^2 + \sigma_{j,M-j})\beta_j/r > 0$$

also $\partial\beta_j/\partial\sigma_j^2 > 0$

$$\partial\beta_j/\partial\phi_j^2 < 0$$

Since σ^2 is interpreted as the level of uncertainty inherent in the random variable $\tilde{x}_j$ and ϕ^2 as the level of noise inherent in the reporting process $\tilde{y}_j$, the following proposition can be derived from the model:

The information content of firm j's earnings is

1. positively correlated with the uncertainty of its production and investment activities (σ^2), and

2. negatively correlated with the noise of the firm's reporting process (ϕ^2).

3.4 Hypothesis and Research Design

Previous discussion can be summarized as the following: the information content of earnings is positively correlated with the uncertainty of firm-specific investment/production activities and negatively correlated with the noise of reporting process after controlling for the magnitude of unexpected earnings.

For multinational firms, the uncertainty of foreign investment/production activities (σ_F^2) can be estimated by the inverse of degree of international diversification. Based on portfolio theory, the greater the international diversification, the less uncertain of MNC's investment/production activities when MNCs are compared with domestic firms. On the other hand, the translation gains/losses incorporated in earnings required by SFAS No. 8 may obscure the information content of earnings signal as suggested by Choi. Overall, with possibly smaller σ^2 and greater ϕ^2 compared with domestic firms, the earnings response coefficient of

MNCs may be no different from that of domestic firms even though individual component may be different.[12] The contribution of the theoretical model is that it suggests that there are two competing firm-specific sources in determining security price reactions to accounting information.

In the foreign currency translation setting, the information content of translation gains/losses can be examined only if firm-specific production/investment activities are controlled. This is especially important when there is evidence that accounting policy changes shifted MNCs' real decisions (see Evans, Folks, and Jilling (1978)). The Choi model not only helps improve research design but also points out deficiencies of previous studies because they did not evaluate the two types of risk differently. In this study, the subject of information content is the standard of foreign currency translation and, given the Choi model, evaluation of the content will then depend on the effectiveness of controlling for the uncertainty associated with production/investment activities. The research hypotheses of differential information content can now be stated as follows:

> $H1_0$: Conditional on controlling for the uncertainty in production/investment activities, the perceived information content of earnings based on SFAS No. 8 is the same as that based on SFAS No. 52.
>
> $H1_1$: Conditional on controlling for the uncertainty in production/investment activities, the information content of earnings based on SFAS No. 8 is perceived as different from that based on SFAS No. 52.

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12 This may explain why Dukes (1978) and Makin (1978) did not find any statistically significant differences between portfolios of domestic firms and MNCs.

This hypothesis can be tested from two different perspectives. Because of the transition periods allowed by FASB, it was possible for multinational firms to adopt SFAS No. 52 in either 1981, 1982, or 1983 fiscal year. For firms with fiscal year ending in December, they could choose to adopt SFAS No. 52 early in fiscal year 1981. A more complete test of market reactions to early vs. late adopters of SFAS No. 52 with an implication of differential earnings quality based on either SFAS No. 8 or No. 52 can be examined by a research design to be presented below based on the following discussion.

As stated in section 3.3, the earnings response coefficient β_j is an increasing function of σ^2 and a decreasing function of ϕ^2. Therefore, we have the following decomposed relationship:

$$\beta_j = a_0 + a_1\phi^2 + a_2\sigma^2, a_1 < 0, a_2 > 0$$

$$CAR_j = \alpha_j + \beta_j UE_j + e_j = \alpha_j + a_0 UE_j + a_1\phi^2 UE_j + a_2\sigma^2 UE_j + e_j$$

The above relationship suggests that ϕ^2 and σ^2 interact with unexpected earnings in determining the association between security price and earnings, assuming β_j is a linear function of ϕ^2 and σ^2. In this study, the research focus will be on the coefficient of differential information content of earnings represented by $\phi^2 UE_j$. Since there were concerns that MNCs' real decisions shifted due to regulations of foreign currency translation, this can be tested by examing any shift of association between security price and international involvement under two different regimes (SFAS No. 8 and No. 52).

The following regression will be used to test the hypothesis for fiscal year 1981 only:

$CAR_j = a + b_1 UE_j + b_2 D_j * UE_j + b_3 DAF_j * UE_j + b_4 DOI_j + b_5 D_j * DOI_j + b_6 NOE_j + e_j$ (3.1)

CAR_j: Cumulative abnormal returns for firm j,

UE_j: Unexpected earnings for firm j,

DAF_j: Dispersion of analysts' forecasts for firm j as a surrogate of σ^2,

DOI_j: Degree of internationalization for firm j,

NOE_j: Number of analysts' forecasts available from IBES for firm j, which is a surrogate for the information environment of firm j,

D_j: Dummy variable which is 1 if firm j is an early adopter of SFAS No. 52, and 0 if firm j is a late adopter of SFAS No. 52, used as a surrogate of ϕ^2,

e_j: Error term.

While b_1 has an expected positive sign based on previous research, b_2 is used to test the specification of Choi's model about the differential information content of earnings signal. The dummy variable D_j is used to test if there is any incremental information content of earnings for No. 52 early adopters after controlling for the uncertainty of the firm's investment and production activities. If the market perceives earnings reported by early adopters of No. 52 as less noisy signals due to the exclusion of translation gains/losses, we should expect a positive sign from b_2. On the other hand, the market may regard earnings without translation information as incomplete and therefore, less quality of earnings for early adopters, then the expected sign should be negative. The variable DAF_j is used as a proxy of the uncertainty of the firm's investment/production activities. According to the earlier discussion, the expected sign of b_3 should be positive.

Finally, DOI_j is a surrogate for possible hedging costs for firm j when SFAS No. 8 was in effect, which is a special kind of uncertainty unique to multinational firms, while NOE_j is used to control for the information environment documented by Atiase (1985). Based on portfolio theory, the more foreign operations involved in different countries, the less business and exchange risks involved for the firm. Therefore, there should be less need for hedging for firms which involve in different regions of countries where the covariance of exchange rate movements is low. On the other hand, firms with fewer foreign subsidiaries may be subject to more serious exchange risk, and more demand for hedging. It can also be argued that hedging costs even for accounting exposures are lower for firms more diversified than firms less diversified assuming economy of scale and intercompany transfers usually are cheaper than forward or futures contracts. Overall, while foreign operations may provide diversification and less uncertainty, and therefore positive effect on stock returns, we may expect less hedging costs for firms adopting SFAS No. 52 early than other MNCs. Ayres (1986b) provides evidence that early adopters of No. 52 are smaller in size than late adopters while Haw, Lilien, and Pastena (1986) observe higher foreign assets ratio for early adopters. This may suggest that firms with higher concentration of their foreign operations may subject to higher exchange risks than others, and consequently have more motivation to adopt No. 52 early. An entropy measure of foreign diversification (ENT) as well as the absolute number of foreign subsidiaries (NOS) will be used as surrogates for the possible diversification effects or hedging costs in this study.[13] Since early adopters may be firms which have

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13 If DOI is interpreted as potential hedging costs, then the more diversification of foreign operations, the less costs of hedging and the more positive stock returns. If DOI is a surrogate of foreign diversification, there

less diversification effects from their foreign operations, the expected sign of b_5 is positive because early adoption should discourage MNCs to hedge accounting exposure according to proponents of SFAS No. 52. The information environment suggested by Atiase (1985) is used as a control variable, the expected sign of b_6 should be negative.

Based on the prediction of the model and previous discussion, we have the following testable hypothesis:

$H1_0$: $b_1 = b_2 = b_3 = b_4 = b_5 = b_6 = 0$

$H1_1$: $b_1 \neq 0, b_2 > 0, b_3 > 0, b_4 > 0, b_5 > 0, b_6 < 0$

An alternative way of testing differential information content of earnings is the long term association as the following:

$$CAR_{jt} = a + b_1\ UE_{jt} + b_2\ D_{jt}{}^*\ UE_{jt} + b_3\ DAF_{jt}{}^*\ UE_{jt} + b_4\ DOI_{jt} + b_5\ D_{jt}{}^*DOI_{jt} + b_6\ NOE_{jt} + e_{jt} \qquad (3.2)$$

D_{jt}: Dummy variable which is 0 if t=1976 to 1980 (SFAS No. 8), and is 1 if t=1983 to 1986, and other variables are defined as before.

In this setting, a time-series, cross-sectional variance-component regression is analyzed for the periods of 1976 to 1980 and 1983-1986. This long-term association test provides similar predictions but a different interpretation of b_2:

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should be a positive correlation between DOI and firm value (see Errunza and Senbet (1984)). In either case, the coefficient of DOI is expected to be positive.

$H1'_0$: $b_1 = b_2 = b_3 = b_4 = b_5 = b_6 = 0$

$H1'_1$: $b_1 \neq 0, b_2 > 0, b_3 > 0, b_4 > 0, b_5 > 0, b_6 < 0$

Equation 3.2, which is a different research design from equation 3.1, considers the issue of differential information content from a long-term perspective. While earnings response coefficient may not be stable over the period, it provides an alternative test of mean effect of two regimes, which complements the test of early vs. late adopters of equation 3.1. Since equation 3.2 does not directly control for other events which may affect the association between security price and earnings signal, a direct test of association between security price and translation gains/losses is considered in the following section.

3.5 The Information Content of Translation Gains/Losses

There are two different views of translation gains/losses in accounting literature. The first view states that reported translation gains/losses have no unambiguous economic interpretation across all firms because they may reflect different effects of hedges undertaken by the firm (see Griffin (1982)). Another view, however, argues that translation gains/losses should be included in earnings in order to reflect the economic meanings of transactions denominated in different currencies (Beaver and Wolfson (1984)). The basic differences between these two opposing views lie in not only the assumptions of exchange rate determination and the assets/liabilities valuation, but also the possible effects of hedging undertaken by the management. How the stock market reacts to translation gains/losses originating from accounting exposure is an important empirical question, and

can be important in assessing whether hedging accounting exposure is justified or not. One major criticism of SFAS No. 8 was the inclusion of translation gains/losses, which was supposed to increase the volatility of reported earnings and encouraged the hedging of accounting exposure. SFAS No. 52 avoids the same criticism by requiring translation gains/losses be included in owners' equity section directly if local foreign currency is chosen as functional currency. However, if the market perceives the importance of translation gains/losses, it will react to this information no matter where they are disclosed.

Kelly and Lee (1987) examined the relationship between translation gains/losses based on SFAS No. 52 and firm valuation. However, they found a negative correlation and had difficulty interpreting the results. Their results suggest that an underlying theory and a more powerful research design may be necessary to solve this mystery.

In this study, two research questions related to the information content of translation gains/losses will be examined:

1. Does stock market react to translation gains/losses?
2. Are there any differential reactions to translation gains/losses based on SFAS No. 8 and No. 52?

The first question examines whether the market perceives translation gains/losses as part of the earnings with potential cash flow impacts, while the second question investigates whether the market reacts to translation gains/losses under different translation methods (temporal vs. current rate method) differently. These two questions have important implications for foreign currency translation methods. Previous studies (e.g. Dukes (1978) and Makin (1978)) did not find evidence of negative market reactions to SFAS No. 8. However, one possible explanation is that the effects of SFAS No. 8 may vary

across firms, and the traditional market model design may not be powerful enough to detect any firm-specific effects. A direct test of the relationship between stock returns and translation gains/losses will provide further evidence of market reactions to translation gains/losses. If an unambiguous relationship between translation gains/losses and firm valuation can be established, it may help explain why managers of MNCs are willing to hedge accounting exposure.[14] On the other hand, if there is no direct link between valuation and translation adjustments, we may question the judgement of managers to hedge accounting exposure. Therefore, the following two hypotheses will be tested in this study:

$H2_0$: Translation gains/losses under both translation methods have no information content.

$H2_1$: Translation gains/losses, under either translation method, have information content.

$H3_0$: There are no differential market reactions to different translation methods.

$H3_1$: There are differential market reactions to different translation methods.

These two hypotheses can be tested by the following regression:

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[14] A recent study by Amershi and Sunder (1987) suggests another possibility. Under certain conditions, the stock price reactions would reinforce instead of correcting erroneous managerial decisions. For example, if manager thinks investors do not prefer volatile earnings, and therefore hedges accounting exposure. However, the market may react to the translation information because of potential costs of hedging, but manager may use this reaction to justify his decisions. And this can be a viable explanation of what actually went on.

$CAR_{jt} = a_t + b_{1t}\ UE_{jt} + b_{2t}\ UTGL_{jt} + e_{jt}$ (3.3)

CAR_{jt}: Cumulative abnormal returns for firm j at time t (t=1976-1980 or 1983-1985),

UE_{jt}: Unexpected earnings before translation gains/losses for firm j, if t=1976-1980; and unexpected earnings for firm j, if t=1983-1985,

$UTGL_{jt}$: Unexpected translation gains/losses for firm j at time t (t=1976-1980 or 1983-1985).

If translation gains/losses are perceived as part of earnings, we should expect the same sign and magnitude of b_1 and b_2; and if there are differential reactions to different translation methods, the magnitude of b_2 should be different under different FASB statements. Therefore, we have the following testable hypotheses:

$H2_0$: $b_2 = 0$

$H2_1$: $b_2 > 0$

and,

$H3_0$: $b_{2,\ (t=1976\text{-}1980)} = b_{2,\ (t=1980\text{-}1985)}$

$H3_1$: $b_{2,\ (t=1976\text{-}1980)} \neq b_{2,\ (t=1980\text{-}1985)}$

Theses two tests will complement Hypothesis 1 in understanding the valuation impacts of translation gains/losses, and consequently the quality of reported earnings based on either SFAS No. 8 or No. 52.

3.6 Translation Gains/Losses, Foreign Exchange Risk, and Diversification Effects

Traditional information content studies of accounting information usually try to detect any stock price reactions to the event of information. However, the logical next step is to identify the potential sources of cash flow impacts which may generate the stock price reactions.[15] In this section, we are going to examine whether accounting translation reflects the economic reality of foreign operations, i.e. the risks and benefits of foreign operations, which is one possible source of cash flow impacts on firm valuation.

One major criticism of SFAS No. 8 is that accounting exposure under temporal method does not reflect the economic exposure of foreign operations since accounting exposure is measured as net monetary position in foreign subsidiaries. SFAS No. 52, on the other hand, changes the accounting exposure to the whole owners' equity of foreign subsidiaries. Due to different definitions of accounting exposure, translation gains/losses under different translation methods may reflect different characteristics of multinational firms. Theoretically, foreign currency translation information should reflect the economic reality of multinational firms. Many researchers have argued that firms invest abroad to diversify their real asset portfolio as well as to exploit managerial, technical advantages and economies of scale in foreign production. Hughes, Logue, and Sweeney (1975) suggest that the real asset diversification motive is one of the most prominent of the many reasons offered for the existence of the multinational firms, and their results support

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15 This, of course, will provide a more powerful test of accounting information than traditional event studies.

that investors correctly perceive the diversification benefits of multinational firms. Therefore, if accounting translation is to provide useful information, it should reflect the risks of exchange rate fluctuations and benefits of diversification involved in foreign operations. On the other hand, if no direct relationship is established, we may question the purpose of translation of financial statements and may also have to identify other sources of cash flow impacts on firm value. Therefore the following research question will be the focus of this section:

Does accounting information provided by SFAS No. 8 and No. 52 reflect the degree of foreign involvement and potential cash flows of multinational firms? Are there any differences between these two Statements in reflecting the economic reality of MNCs?

The link between accounting translation information and economic reality may be expressed by explaining the volatility of translation gains/losses, and the following research design is considered:

$$VM(TGL_{8 \text{ or } 52})_i = a + b\,\beta_i + c\,\gamma_i + d\,DOI_i + e_i \qquad (3.4)$$

VMi: Volatility measure of accounting translation gains/losses based on either SFAS No. 8 or No. 52,

β_i: Systematic risk for firm i,

γ_i: Sensitivity of stock returns of firm i to foreign exchange risk,

DOI_i: A measure of degree of internationalization of firm i.

By regressing the volatility of accounting translation information on the firm's systematic risk, sensitivity to foreign risk, and a measure of the degree of international involvement, the link between accounting

information and economic reality can be examined with the following hypothesis:

$H5_0$: $b = c = d = 0$

$H5_1$: $b > 0, c > 0, d < 0$

Hypothesis 5 basically examines whether the volatility of translation gains/losses reflects the risks and benefits of international operations. It can also provide a clue of which accounting translation methods reflects more of the economic reality of multinational firms.

In this chapter, information provided by SFAS No. 8 and No. 52 is designed to be examined from different perspectives. First, the information content of earnings based on different translation methods is compared based on a model suggested by Choi (1985). Then, the direct relationship between stock returns and translation gains/losses is examined to understand how the market reacts to this accounting information. Finally, accounting translation information is correlated with market information to see whether translation gains/losses provide any cash flow implications and reflect the economic reality of multinational firms. By examining SFAS No. 8 and No. 52 from these three different perspectives, we can understand the information content and cash flow implications of accounting translation information in a way which cannot be approached by a traditional event study. The next chapter presents the empirical results and discussion of this chapter's research designs.

CHAPTER 4
DATA ANALYSIS AND DISCUSSION OF EMPIRICAL RESULTS

4.1 Introduction

This chapter summarizes the empirical results of those testable hypotheses presented in Chapter 3. Sample selection and data sources are described first in the next section. The empirical results related to earnings quality of SFAS No. 8 and No. 52 are presented in Section 4.3. The possible differential information content of translation gains/losses based on SFAS No. 8 and No. 52 is discussed in the section thereafter. Finally, the association between accounting translation information and foreign involvement of multinational firms with foreign cash flow implications is tested in Section 4.5.

4.2 Sample Description

A sample of multinational firms were selected from Fortune 100 Largest U.S. Multinational Corporations in 1986 and the World Directory of Multinational Enterprises 1982-1983 (Stopford, 1982). The directory provides not only accounting information of these multinational corporations, but also several measures of the degree of the companies' multinationality. Originally, 195 firms were included in the sample because of available data on CRSP and COMPUSTAT data bases. However, due to other constraints and availability of other variables from Value Line and IBES data bases, the final sample is

reduced to 135 firms. Table 4-1 provides a profile of the final sample. Also, the distribution of their industry classification is presented, and the majority of the sample firms were selected from 2000 and 3000 SIC code. However, the sample should be representative of the profile of multinational corporations and any industry effect is not expected.[16] Table 4-2 provides some descriptive statistics of the sample firms.

4.3 Differential Earnings Quality

In this section, two major topics are examined. One is the market reactions to early vs. late adopters of SFAS No. 52 for fiscal year 1981. The other is the comparison of overall earnings quality under two different accounting translation methods (SFAS No. 8 vs. No. 52). These two separate designs can complement each other and provide better insights on Hypothesis 1 discussed in Chapter 3.

4.3.1 Market Reactions to Early vs. Late Adopters of SFAS No. 52

Equation 3.1 is the design to test market reactions to early vs. late adopters of SFAS No. 52 in 1981 as the following:

$$CAR_j = a + b_1 UE_j + b_2 D_j^* UE_j + b_3 DAF_j^* UE_j + b_4 DOI_j + b_5 D_j^* DOI_j + b_6 NOE_j + e_j \quad (3.1)$$

CAR_j: 15-month cumulative abnormal returns for firm j,

UE_j: Unexpected earnings for firm j,

16 The sample firms in Kelly and Lee (1987) are also concentrated in 2000 and 3000 SIC codes. See Table 2 in their study.

DAF_j: Dispersion of analysts' forecasts for firm j,

DOI_j: Degree of internationalization for firm j,

NOE_j: Number of analysts' forecasts available from IBES for firm j, which is a surrogate for the information environment of firm j,

D_j: Dummy variable which is 1 if firm j is an early adopter of SFAS No. 52, and 0 if firm j is a late adopter of SFAS No. 52,

e_j: Error term.

The major contribution of this test is to associate cumulative returns directly to firm-specific variables based on a theoretical model discussed in Chapter 3. This corrects for the deficiencies of previous studies and provides a more powerful test of market reactions to accounting policy changes. The results of Equation 3.1 are summarized in Table 4-3 and 4-4. The dependent variable CAR is measured as 15-month cumulative residual returns based on a market model from January 1981 to March 1982, and the market model was estimated using 60-month periods before January 1981. The use of 15-month cumulative residual returns instead of 12-month periods was based on the suggestion by Collins and Kothari (1987). They provide evidence that 15-month CAR provides higher association with earnings than other lengths of CAR. Unexpected earnings is measured as the following:

$UE_j = (EPS_j - FAF_j)/|FAF_j|$

EPS_j: Earnings per share for firm j,

FAF_j: The mean of financial analysts' forecasts of EPS for firm j from IBES tape.

DAF_j is measured as the standard deviation of analysts forecasts scaled by the mean of analysts forecasts, both variables are available from IBES tape. DOI_j, the degree of internationalization for firm j, can be measured as either the total number of foreign subsidiaries (NOS) or an entropy measure of internationalization (ENT) suggested by Miller and Pras (1980) as the following:[17]

$$ENT = -\sum_{k=1}^{n} S_k \log S_k$$

where S_k is the ratio of number of subsidiaries in region k to the total number of its foreign subsidiaries. Following the authors' suggestion, seven regions namely, European Economic Community (EEC), European Free Trade Area, COMECON, EEC Associates plus Spain, developed industrialized countries, less developed countries, and Canada-Mexico are defined in measuring ENT. The information of foreign subsidiaries were collected from Stopford (1982). In Table 4-3, ENT was used to measure the degree of multinationality, a surrogate for the potential benefits of diversification and possible hedging costs of accounting exposure. NOS was applied in Table 4-4. The results do not change dramatically although ENT provides a slightly better fit than NOS.

As can be seen from both Tables, the signs of all the coefficients are consistent with prior expectations. However, only b_2 and b_4 are significant at 0.01 level, while b_3 and b_6 are significant at 0.10 level. Adjusted R^2 and F statistic are comparable to other studies using monthly stock returns. Overall, the results seem to support the predictive ability of the theoretical model

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17 The entropy measure is an alternative empirical measure of international diversification, and provides a better association with security price than number of foreign subsidiaries. Entropy measure here is not used to imply any superior information value as criticized by Abdel-khalik (1974).

discussed in Chapter 3 and therefore provide a more powerful test than previous studies in this area.

The major focus in this study is the significance levels and signs of b_2 and b_5. According to the prediction of the theoretical model, after controlling for other variables, the differential information content of earnings signals should be captured by b_2. A significant and positive b_2 would suggest that market reacted more favorably to early adopters of SFAS No. 52 than to late adopters due to better earnings quality, because dummy variable in this analysis is one for early adopters of SFAS No. 52. Therefore, the empirical results seem to suggest that the market reacted more favorably to early adopters because of better earnings quality of early adopters perceived by the market. However, this is not a direct test of differential earnings quality, rather this is a comparison of profiles of early and late adopters of SFAS No. 52. A direct and long-term comparison of earnings quality between SFAS No. 8 and No. 52 will be examined in Section 4.3.2.

Another possible explanation for favorable market reactions to early adopters is that costs of hedging accounting exposure can be greatly reduced after switching to SFAS No. 52 since translation gains/losses will not be affecting earnings any more. However, this explanation is only partially supported when NOS was applied in Table 4-4, and b_5 is positive and significant at 0.05 level for one-tail test. When ENT was used in Table 4-3, b_5 is not significant.

In summary, the results provide some evidence that the market reacted more favorably to early adopters of SFAS No. 52 probably because of differential earnings quality. Previous studies of early adoption of SFAS No. 52 failed to explain why a positive reaction is expected for early adopters, and Brown and Brandi (1987) suggest that this is evidence of market inefficiency.

Contrary to Brown and Brandi (1987), the results in this section provide two possible explanations why market reacted favorably to early adopters based on a theoretical model and a direct association between stock returns and firm-specific variables. The evidence is basically consistent with both explanations, and therefore the market reacted favorably to early adopters, which was also documented by previous studies (see Brown and Brandi (1987) and Haw, Lilien, and Pastena (1986)).

4.3.2 A Comparison of Earnings Quality Based on SFAS No. 8 and No. 52

In this subsection, the quality of earnings is examined from a long-term association instead of an event (short-term) study. The research design is based on Equation 3.2 as the following:

$$CAR_{jt} = a + b_1\ UE_{jt} + b_2\ D_{jt}{}^*\ UE_{jt} + b_3\ DAF_{jt}{}^*\ UE_{jt} + b_4\ DOI_{jt} + b_5\ D_{jt}{}^*DOI_{jt} + b_6\ NOE_{jt} + c_{jt} \qquad (3.2)$$

D_{jt}: Dummy variable which is 0 if t=1976 to 1980 (SFAS No. 8), and is 1 if t=1983 to 1985, and other variables are defined as before.

In this design, a dummy variable is used to distinguish two time periods regulated by different accounting translation methods. During the period of 1976 to 1980, SFAS No. 8 was in effect, and SFAS No. 52 is applied to all multinational firms after 1983. Both 1981 and 1982 were excluded from this analysis because of the transition periods allowed by the FASB, which may provide some confounding effects. Since there was no data on market expectation of translation gains/losses available, the quality of earnings based on SFAS No. 8 and No. 52 can only be inferred from differential earnings

response coefficient during two different time periods.[18] The expectations of the coefficients can be stated as follows:

$H1'_0$: $b_1 = b_2 = b_3 = b_4 = b_5 = b_6 = 0$

$H1'_1$: $b_1 > 0$, $b_2 \neq 0$, $b_3 > 0$, $b_4 > 0$, $b_5 > 0$, $b_6 < 0$

Again b_2 will be used to identify the quality of earnings signal regulated by different accounting policies. A positive sign of b_2 would suggest a less noisy signal based on SFAS No. 52. However, if b_2 is negative, it may suggest accounting translation gains/losses do provide valuation implications and the market reactions to SFAS No. 8 were different from reactions to SFAS No. 52.

Due to the nature of the design, a time-series cross-section regression based on variance components model was applied in this analysis (see Maddala (1977) for a detailed discussion of variance components model). A variance components model is basically a generalized least squares method incorporating both time-series and cross-sectional covariance components in estimating regression coefficients. For comparison purpose, a pooled time-series and cross-section regression is also presented. Although variance components model is supposed to provide more efficient and unbiased estimators, the results based on variance components model are similar to those based on pooled regression in this section. However, variance components model can still be useful in other accounting research.

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18 The difference between Equation 3.1 and 3.2 is the control group used in the research design. In equation 3.1, late adopters were used as control group, while the same firm at a different time period will be used as control group in Equation 3.2.

The empirical results based on pooled regression are presented in Table 4-5, and the results from variance components model are summarized in Table 4-6. Since using NOS and ENT provides similar results, only results based on ENT are reported. As can be seen from both tables, variance components model provides almost identical inferences as suggested by pooled regression. The signs of coefficients are consistent with the predictions of the models in most cases and only b_5 is not statistically significant. Adjusted R^2 and F statistic from pooled regression are also comparable to other studies.

The major focus again is the sign and statistical significance of b_2 and b_5. Contrary to the findings in the previous section, b_2 is significantly negative, which suggests that market reacts less favorably to earnings signal based on SFAS No. 52. Although the research design is quite different from Equation 3.1, it may be necessary to reconcile the conflicting evidence of b_2. Namely, why did market react more favorably to firms switching to SFAS No. 52 while reacted less favorably to earnings signals during post SFAS No. 52 periods. A possible explanation of this contradiction is provided by Collins and Kothari (1987). They suggest that earnings response coefficient is a decreasing functioon of interest rates in an intertemporal setting, namely, the higher the interest rates, the lower the earnings response coefficient. An examination of the interest rates during 1976-1980 and 1983-1985 indicates that interest rates were relatively low from 1976 to 1978 and started climbing up since. Although interest rates came down after 1983, they were still higher than interest rates during 1976-1978 period. This provides an alternative explanation why earnings response coefficients were higher during 1976-1980 period. In order to test for this competing explanation, an interaction term of interest rates and unexpected earnings was added to Equation 3.2 as the following:

$CAR_{jt} = a + b_1\ UE_{jt} + b_2\ D_{jt}{}^*\ UE_{jt} + b_3\ INT_t{}^*\ UE_{jt} + b_4\ DAF_{jt}{}^*\ UE_{jt} + b_5\ DOI_{jt} + b_6\ D_{jt}{}^*DOI_{jt} + b_7\ NOE_{jt} + e_{jt}$ (3.2')

INT_t: Yields of 3-month Treasury Bills at year t, and other variables are defined as before.

$INT_t{}^*\ UE_{jt}$ is used to control the general impact of interest rates on earnings response coefficients in an inter-temporal design, and b_3 is expected to have a negative sign as suggested by Collins and Kothari (1987). The results of Equation 3.2' are presented in Table 4-7 and 4-8. As before, Table 4-7 provides pooled regression results while Table 4-8 has the results of variance components model. Variance components model apparently provides better empirical results than pooled regression this time; however, both b_2 and b_3 are significantly negative from both models. Therefore, both analyses provide evidence that even after controlling the possible impact of interest rates on earnings response coefficients, b_2 is still significantly negative. Therefore, the notion that securities market reacted more strongly to earnings based on SFAS No. 8 during 19776-1980 period seems to withstand the tests after ruling out an alternative explanation.

Another possibility to reconcile the contradictory evidence is to examine if there is any self-selection of early adopters compared with late adopters. Ayres (1986b) and Haw, Lilien, and Pastena (1986) provide evidence that early adopters are quite different from late adopters in several respects. Collins and Kothari (1987) also suggest that earnings response coefficient is a function of growth, risk, and earnings persistence in a cross-sectional setting. Therefore, earnings response coefficients of early adopters may be systematically different from those of late adopters. Table 4-9 and 4-10 intend

to explore this possibility. In both tables, dummy variables are used to distinguish between early and late adopters. Table 4-9 covers the period of 1976-1980, while Table 4-10 covers the period of 1983-1985.

Clearly from Table 4-9, there were significant differences of earnings response coefficients during 1976-1980. Therefore, the positive sign of b_2 observed from Table 4-4 and 4-5 earlier cannot be attributed to the adoption of SFAS No. 52 because the same positive sign can be observed even before 1981. However, b_2 is not significant any more after 1983. For whatever reason, the systematic difference of earnings response coefficients between early and late adopters disappeared during 1983-1985 period. Based on the evidence so far, it seems to suggest that the association between stock returns and earnings based on SFAS No. 8 is stronger than that between returns and earnings based on SFAS No. 52, which is consistent with the suggestion by Beaver and Wolfson (1984).[19]

Another interesting question related to the controversy of hedging accounting exposure can also be examined by the sign and significance level of b_5 from Equation 3.2. From both Table 4-5 and 4-6, we find b_5 is significantly positive which suggests that securities market reacted more favorably to multinational firms' foreign operations during 1983-1985 than during 1976-1980 period. The evidence is consistent with the contention that adopting SFAS No. 52 reduces costs of hedging accounting exposure and has positive cash flow impacts on firm value. While results from Table 4-3 and 4-4 also marginally supports the above statement. The long-term association from Table 4-5 and 4-6 provides much stronger evidence.

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19 However, this is not a direct test of their theoretical model and never intends to be one.

Under the guidance of a theoretical model and and elimination of competing explanations, we can summarize the analysis as the following:

1. The evidence seems to suggest that stock price is associated with earnings signals based on SFAS No. 8 more strongly than signals based on SFAS No. 52 even after controlling for other coompeting variables. On the other hand, the stronger association with early adopters of SFAS No. 52 cannot be attributed directly to the early adoption. The higher earnings response coefficients for early adopters may be credited to other factors which self-select those firms into this early adoption group. A further investigation of this issue is warranted.

2. There is evidence that multinational firms benefited more from their foreign operations during post-SFAS No. 52 period. This is consistent with the contention that switching to SFAS No. 52 might have a positive cash flow impact on firm value probably due to the reduction of costs of hedging accounting exposure.

The above evidence also explains why earlier event studies had a difficult time predicting and detecting any effects of SFAS No. 8 and No. 52 because multinational firms may not be affected to the same extent by the policy changes. In this section, a more powerful methodology suggests that there are at least two different forces driving the differential information content of SFAS No. 8 and No. 52.

4.4 Differential Information Content of Translaton Gains/Losses

Section 4.3 examines the earnings signals influenced by SFAS No. 8 and No. 52 based on a theoretical model. However, due to the lack of market expectations of accounting translation gains/losses, the test of information

content of earnings signals is indirect at best. This section examines the direct association between stock returns and accounting translation variables, which will corroborate the results of the previous section. For example, a more significant association between stock returns and accounting translation gains/losses based on SFAS No. 8 will be consistent with the evidence presented in Section 4.3 that market reactions toward earnings based on SFAS No. 8 were stronger.

The motivation to examine the association of stock prices and accounting translation adjustments originates from the studies of information content of accruals by Rayburn (1986) and Wilson (1986). The interesting question related to foreign currency translation is whether translation gains/losses have any cash flow impacts. If so, where do the cash flow implications come from? However, the research design in this section considers the following hypotheses:

$H2_0$: Translation gains/losses under both translation methods have no information content.

$H2_1$: Translation gains/losses, under either translation method, have information content.

$H3_0$: There are no differential market reactions to different translation methods.

$H3_1$: There are differential market reactions to different translation methods.

And the following regression will test the above hyootheses:

$$CAR_{jt} = a_t + b_{1t}\ UE_{jt} + b_{2t}\ UTGL_{jt} + e_{jt} \qquad (3.3)$$

CAR_{jt}: Cumulative abnormal returns for firm j at time t (t=1976-1980 or 1983-1985),

UE_{jt}: Unexpected earnings before translation gains/losses for firm j, if t=1976-1980; and unexpected earnings for firm j, if t=1983-1985,

$UTGL_{jt}$: Unexpected translation gains/losses for firm j at time t (t=1976-1980 or 1983-1985).

As before, CAR is accumulated for 15-month period from January, t to March, t+1. Both UE and UTGL are estimated assuming random-walk model as the following:

$UE_{jt} = (NIB_{jt} - NIB_{j,t-1})/SALES_{jt}$ (t=1976-1980)

$UE_{jt} = (NI_{jt} - NI_{j,t-1})/SALES_{jt}$ (t=1983-1985)

$UTGL_{jt} = (TGL_{jt} - TGL_{j,t-1})/SALES_{jt}$

NIB_{jt}: Net income excluding translation gains/losses for firm j at year t.

As mentioned earlier, due to the lack of market expectations of accounting translation variables, the direct association between stock returns and accounting translations relies on the assumption that both net income and translation adjustments follow random-walk model. The results of Equation 3.3 are summarized in Tables 4-11 to 4-15.

Table 4-11 and 4-12 provide cross-sectional analyses during 1976-1980 and 1983-1985. In four out of five years during the period of 1976-1980, b_2 is significant at 0.10 level (one-tail test) and consistent with the expected sign. On the other hand, only in 1985, b_2 is significant at 0.10 level for one-tail test. The preliminary evidence seems consistent with results obtained in Section 4.3. The results of time-series cross-section regression based on variance components model are shown in Table 4-13 and 4-14. Although b_2 is

significant in both tables, b_2 estimated during 1976-1980 period has larger magnitude and more significant t-statistic. Table 4-15 presents evidence that the magnitude of the response coefficients of translation gains/losses is larger and statiscally significant during 1976-1980 period than during 1983-1985 period. The evidence obtained in this analysis is contradictory to Kelly and Lee (1987). While their study found negative correlation between stock returns and translation adjustments based on SFAS No. 52, results in this section show either insignificant or positive correlation. Several factors may contribute to the differences. First, the sample size is larger in Kelly and Lee's study. Second, different deflators in calculating UNI and UTGL may contribute to some of the differences.[20] Finally, 15-month CAR was employed in this study, while Kelly and Lee used 12-month CAR.[21] The evidence, presented in this section so far, is consistent with the hypothesis that stock returns have a more significant correlation with translation gains/losses based on SFAS No. 8, and is also consistent with the results presented in Section 4.3.

Kelly and Lee (1987), using a similar methodology, provide evidence that there is a negative correlation between firm valuation and translation adjustments based on SFAS No. 52. However, the authors failed to explain why there should be a negative correlation. Translation adjustments under SFAS No. 52 is a function of net assets of foreign subsidiaries weighted by the change of exchange rates of each country. While there may be other possible explanations, one possibility is that translation adjustments are really

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20 Kelly and Lee (1987) uesd market valur as deflator, while total sales were applied in this study.

21 The authors accumulted residual monthly returns from January to December. Since translation information on financial statements is usually released in February or March, a different accumulation of CAR may better capture the information content of translation adjustments.

surrogates of the foreign involvement of MNCs. A correlation matrix of those variables involving foreign operations are presented for 1983 in Table 4-16. The table clearly shows that translation adjustments based on current rate translation are negatively correlated with almost every other variables surrogating the degree of foreign involvement of sample firms. This provides a viable explanation that translation adjustments are really a surrogate of MNCs' foreign involvement. In order to test this competing hypothesis, ENT and NOS were incorporated into Equation 3.3, and empirical results are shown in Table 4-17 and 4-18. As can be seen from these two tables, even after controlling the effect of ENT and NOS, translation gains/losses based on SFAS No. 8 are still significant at 0.10 level for four out of five years during 1976-1980 period, while none of the coefficient for translation adjustments is significant during 1983-1985 period after controlling for the effects of ENT and NOS. Therefore, evidence from Table 4-16, 4-17, and 4-18 is consistent with the hypothesis that translation adjustments might be surrogates of foreign involvement of MNCs.

In summary, the evidence from this section is consistent with that of previous section and provides a direct association between stock returns and translation gains/losses based on SFAS No. 8. Also, the evidence shows that translation adjustments based on SFAS No. 52 are surrogates of the degree of foreign involvement of MNCs, which may explain the empirical results of Kelly and Lee (1987).

So far, the evidence does suggest that stock market reacted to the translation information of SFAS No. 8. However, the source of cash flow impacts of SFAS No. 8 is still unclear. There are two possible explanations why accounting translation information may have cash flow impacts on firm value. The first possibility is that translation information reflects the risks

and benefits of foreign operations, and therefore provides future foreign cash flow information. Another possibility, however, is due to the changes of managerial decisions and/or contracting costs caused by the regulation of accounting translation. Amershi and Sunder (1987) argue that when investor decision rules that generate market prices are not common knowledge among managers so that managers may hold incorrect beliefs about investors' behavior and decisions rules, the stock market may generate prices that reinforce their incorrect belief instead of disciplining these managers. In the foreign currency translation case, managers may feel necessary to hedge accounting exposure because of the volatility of earnings. However, if the market reacted negatively to the potential costs of hedging accounting exposure, managers may interpret the results as justification of hedging although the causality is quite the opposite. The next section will examine the potential cash flow impacts of accounting translation information.

4.5 Accounting Translation Information and Foreign Involvement of MNCs

As discussed in the previous section, there are two possible explanations why accounting translation information might have cash flow impact on firm value. Whether accounting translations based on either SFAS No. 8 or No. 52 reflect the foreign involvement of MNCs and therefore potential foreign cash flows is the focus of this section. The results from this section and next chapter also provide the implications of the usefulness of accounting translation information.

In order to establish the link between accounting translation information and the benefits and risks of foreign operations, the following design is introduced in Chapter 3:

$VM(TGL_{8 \text{ or } 52})_i = a + b\,\beta_i + c\,\gamma_i + d\,DOI_i + e_i$ (3.4)

VM_i: Volatility measure of accounting translation gains/losses based on either SFAS No. 8 or No. 52 for firm i,

β_i: Systematic risk for firm i,

γ_i: Sensitivity of stock returns of firm i to foreign exchange risk,

DOI_i: A measure of degree of internationalization of firm i.

with the following expectations:

$H5_0$: $b = c = d = 0$

$H5_1$: $b > 0, c > 0, d < 0$

In this design, VM_i is measured as the standard deviation of translation gains/losses during either 1976-1980 or 1983-1986 period. Since there are only a few observations in each period, it is more appropriate to estimate the volatility measure using quarterly data. Unfortunately, quarterly data are not available for most firms, and the analysis may therefore be biased against finding significant results. The coefficients of β_i and γ_i are estimated based on the following two-factor market model:

$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_i ue_t + e_{it}$ (t=Jan 1976-Dec 1980 or t=Jan 1983-Dec 1986)

R_{it}: Monthly stock return for firm i at time t,

R_{mt}: Equally weighted market index at time t,

ue_t: Unexpected exchange rate movement at time t, assuming e_t a random walk model,

DOI, as before, is measured as either number of foreign subsidiaries (NOS) or entropy measure of foreign diversification (ENT). While β and γ are supposed to capture the risks of foeign operations, DOI is a surrogate of the benefits. The regression results of Equation 3.4 along with correlation matrix of these variables are presented in Table 4-19 and 4-20.

As mentioned earlier, due to the limited observations in estimating the volatility of translation adjustments, the empirical results may be biased against finding significant relationship. Table 4-19 provides the correlation between the volatility measure of SFAS No. 8 and independent variables. Although both b and c are statistically significant, their signs are contrary to the prior expectations. On the other hand, both d_1 and d_2 are not significant at conventional level, suggesting that the volatility measure of SFAS No. 8 does not reflect the potential diversification effects of foreign operations. A possible explanation of negative signs of both b and c is that they provide indirect evidence of hedging accounting exposure among the sample firms. Namely, those firms with higher risks involved in foreign operations may tend to hedge their accounting exposure while firms with lower risks may have less incentive to do so. While there is no study examing this issue, the evidence is consistent with the above statement. A more thorough investigation of this issue is warranted and will be considered in Chapter 5.

Table 4-20 provides the correlation between the volatility measure of SFAS No. 52 and the independent variables. In this case, both b and d_2 are significant at conventional levels. However, only the sign of d_2 is consistent with prior expectations. This suggests that the volatility measure of SFAS No. 52 does provide the message of international diversification, which is consistent with the evidence in the previous section that translation adjustments based on SFAS No. 52 is a surrogate of foreign involvement of

MNCs. The negative sign of b may suggest the same argument discussed earlier. However, due to the limitation of accounting variables applied in this section, the results of this section have to be interpreted with caution.

In summary, even with the caution in mind, the evidence in this section basically does not show an association between accounting translation information based on SFAS No. 8 and independent variables, while a limited association between SFAS No. 52 information and diversification effects of MNCs was observed. Overall, there is no evidence supporting that information based on SFAS No. 8 reflects any direct foreign cash flow implications, while there is a limited evidence supporting information provided by SFAS No. 52.

4.6 Summary of Analysis

In this chapter, the differential information content of earnings based on SFAS No. 8 and No. 52 is examined from three different angles. First, differential information content of earnings of early vs. late adopters of SFAS No. 52 is examiined. An alternative way of testing differential content of earnings is by examining temporal differences in the association of earnings and prices based on the required foreign currency translation method when the earnings were announced. This is accomplished by introducing a dummy variable to distinguish between the 1976-1980 (SFAS No. 8) and the 1983-1986 (SFAS No. 52) periods. The evidence from this part of analysis is contradictory. While there was a stronger association between security price and earnings of early adopters of SFAS No. 52, the second part of analysis suggests a stronger association between earnings during 1976-1980 period and security price. The additional analysis suggests that early adopters are a self-

selected group of firms which demonstrate higher earnings response coefficient than their counterpart.

In order to validate the above analysis, a direct association between translation gains/losses and security price is considered in the second part of this chapter. The results suggest stronger association between translation gains/losses based on SFAS No. 8 and stock returns. While the second part of analysis corroborates the earlier analysis, the source of cash flow impact from SFAS No. 8 is still unclear.

The last part of analysis of this chapter considers one potential source of cash flow impact from SFAS No. 8, the reflection of economic reality of MNC's foreign operations. However, this hypothesis was rejected and the evidence seems to suggest a negative correlation between accounting information and economic reality. The next chapter will consider another possibility why accounting translation information may provide cash flow implications, that is, the potential costs of hedging accounting exposure.

TABLE 4-1
Sample Firms Profile

Sample firms available from CRSP and COMPUSTAT	195
Non 12/31 firms	40
Functional Currency is U.S. dollar	17
Not available from IBES tape	10
Missing data from other sources	28
Final sample for most analyses	135

One-Digit SIC Codes of Sample Firms

1 Minning, Construction	5
2 Manufacturing - Foods, Tabacco, Textile, Wood Products, Printing, Chemicals, Petroleum	62
3 Manufacturing - Rubber, Leather, Metal, Machinery, Transportation Equipment	54
4 Transportation, Communications, Electric, Gas	5
6 Finance, Insurance, Real Estate	7
7 Services	2

TABLE 4-2
Descriptive Statistics of Sample Firms

YR=80 (in millions)	MEAN	S. D.
Sales	5,954	9,165
Net Income	312	548
Foreign Sales	2,209	7,102
Foreign Profit	222	687
Foeign Assets	2,513	7,636
Translation Gains/Losses	2.6	26.9
YR=83 (in millions)		
Sales	7,281	12,462
Net Income	355	759
Foreign Sales	1,982	6,067
Foreign Profit	209	704
Foreign Assets	2,724	8,489
Translation Adjustments	-34.2	91.1

TABLE 4-3

Market Reactions to Early vs. Late Adopters of SFAS No. 52 in 1981
Equation 3.1 (DOI measured by ENT)

	Coefficient	t-Stat	Prob>|t|
a	-0.165	-1.25	0.21
b_1	0.088	1.11	0.27
b_2	0.384	2.24	0.02
b_3	0.274	1.42	0.15
b_4	0.252	2.49	0.01
b_5	0.029	0.62	0.53
b_6	-0.007	-1.46	0.14
Adj R^2	0.12		
F-statistic	3.99		0.00

$CAR_j = a + b_1\ UE_j + b_2\ D_j{*}\ UE_j + b_3\ DAF_j{*}\ UE_j + b_4\ ENT_j + b_5\ D_j{*}ENT_j + b_6\ NOE_j + e_j$ (3.1)

CAR_j: 15-month cumulative abnormal returns for firm j,

UE_j: Unexpected earnings for firm j,

DAF_j: Dispersion of analysts' forecasts for firm j,

ENT_j: Degree of internationalization for firm j measured by entropy,

NOE_j: Number of analysts' forecasts available from IBES for firm j, which is a surrogate for the information environment of firm j,

D_j: Dummy variable which is 1 if firm j is an early adopter of SFAS No. 52, and 0 if firm j is a late adopter of SFAS No. 52,

e_j: Error term.

$H1_1$: $b_1 > 0$, $b_2 \neq 0$, $b_3 > 0$, $b_4 > 0$, $b_5 > 0$, $b_6 < 0$

TABLE 4-4

Market Reactions to Early vs. Late Adopters of SFAS No. 52 in 1981
Equation 3.1 (DOI measured by NOS)

	Coefficient	t-Stat	Prob>|t|
a	0.117	1.63	0.10
b_1	0.073	0.90	0.36
b_2	0.408	2.40	0.01
b_3	0.285	1.47	0.14
b_4	0.002	1.36	0.17
b_5	0.002	1.50	0.13
b_6	-0.008	-1.62	0.10
Adj R^2	0.11		
F-statistic	3.71		0.00

$CAR_j = a + b_1 UE_j + b_2 D_j * UE_j + b_3 DAF_j * UE_j + b_4 NOS_j + b_5 D_j * NOS_j + b_6 NOE_j + e_j$ (3.1)

CAR_j: 15-month cumulative abnormal returns for firm j,

UE_j: Unexpected earnings for firm j,

DAF_j: Dispersion of analysts' forecasts for firm j,

NOS_j: Degree of internationalization for firm j measured by number of subsidiaries,

NOE_j: Number of analysts' forecasts available from IBES for firm j, which is a surrogate for the information environment of firm j,

D_j: Dummy variable which is 1 if firm j is an early adopter of SFAS No. 52, and 0 if firm j is a late adopter of SFAS No. 52,

e_j: Error term.

$H1_1$: $b_1 > 0$, $b_2 \neq 0$, $b_3 > 0$, $b_4 > 0$, $b_5 > 0$, $b_6 < 0$

TABLE 4-5

Market Reactions to SFAS No. 8 and No. 52 during 1976-80 and 1983-85
Pooled Time-Series Cross-Section of Equation 3.2 (DOI measured by ENT)

	Coefficient	t-Stat	Prob>|t|
a	-0.008	-0.19	0.84
b_1	0.323	10.26	0.00
b_2	-0.305	-9.45	0.00
b_3	0.0003	2.34	0.02
b_4	0.001	0.04	0.97
b_5	0.051	3.84	0.00
b_6	-0.003	-2.36	0.02
Adj R^2	0.10		
F-statistic	20.62		0.00

$CAR_{jt} = a + b_1\ UE_{jt} + b_2\ D_{jt}{}^*\ UE_{jt} + b_3\ DAF_{jt}{}^*\ UE_{jt} + b_4\ ENT_{jt} + b_5\ D_{jt}{}^*ENT_{jt} + b_6\ NOE_{jt} + e_{jt}$ (3.2)

CAR_{jt}: 15-month cumulative abnormal returns for firm j,

UE_{jt}: Unexpected earnings for firm j,

DAF_{jt}: Dispersion of analysts' forecasts for firm j,

ENT_{jt}: Degree of internationalization for firm j measured by entropy,

NOE_{jt}: Number of analysts' forecasts available from IBES for firm j, which is a surrogate for the information environment of firm j,

D_{jt}: Dummy variable which is 1 if t=1976-1980, and 0 if t=1983-1985

e_{jt}: Error term.

$H1_1$: $b_1 > 0$, $b_2 \neq 0$, $b_3 > 0$, $b_4 > 0$, $b_5 > 0$, $b_6 < 0$

TABLE 4-6

Market Reactions to SFAS No. 8 and No. 52 during 1976-80 and 1983-85
Variance Components Model of Equation 3.2 (DOI measured by ENT)

	Coefficient	t-Stat	Prob>|t|
a	-0.016	-0.34	0.73
b_1	0.351	10.99	0.00
b_2	-0.332	-10.17	0.00
b_3	0.0004	2.42	0.02
b_4	-0.0023	-0.07	0.94
b_5	0.058	1.96	0.05
b_6	-0.002	-1.72	0.08
Adj R^2	N/A		
Variance Component for Cross-Sections			0.00099
Variance Component for Time-Series			0.00332
Variance Component for Error			0.06449
Regression M.S.E.			0.06442

$CAR_{jt} = a + b_1\ UE_{jt} + b_2\ D_{jt}{}^*\ UE_{jt} + b_3\ DAF_{jt}{}^*\ UE_{jt} + b_4\ ENT_{jt} + b_5\ D_{jt}{}^*ENT_{jt} + b_6\ NOE_{jt} + e_{jt}$ (3.2)

CAR_{jt}: 15-month cumulative abnormal returns for firm j,

UE_{jt}: Unexpected earnings for firm j,

DAF_{jt}: Dispersion of analysts' forecasts for firm j,

ENT_{jt}: Degree of internationalization for firm j measured by entropy,

NOE_{jt}: Number of analysts' forecasts available from IBES for firm j, which is a surrogate for the information environment of firm j,

D_{jt}: Dummy variable which is 1 if t=1976-1980, and 0 if t=1983-1985

e_{jt}: Error term.

$H1_1$: $b_1 > 0$, $b_2 \neq 0$, $b_3 > 0$, $b_4 > 0$, $b_5 > 0$, $b_6 < 0$

TABLE 4-7

Market Reactions to SFAS No. 8 and No. 52 during 1976-80 and 1983-85
Pooled Time-Series Cross-Section of Equation 3.2' (DOI measured by ENT)

	Coefficient	t-Stat	Prob>|t|
a	-0.007	-0.17	0.86
b_1	0.391	5.98	0.00
b_2	-0.307	-9.49	0.00
b_3	-0.0077	-1.19	0.23
b_4	0.0002	0.91	0.36
b_5	0.0013	0.04	0.97
b_6	0.051	3.87	0.00
b_7	-0.0026	-2.41	0.02
Adj R^2	0.10		
F-statistic	17.88		0.00

$CAR_{jt} = a + b_1\ UE_{jt} + b_2\ D_{jt}{}^*\ UE_{jt} + b_3\ INT_t{}^*\ UE_{jt} + b_4\ DAF_{jt}{}^*\ UE_{jt} + b_5\ DOI_{jt} + b_6\ D_{jt}{}^*DOI_{jt} + b_7\ NOE_{jt} + e_{jt}$ (3.2')

INT_t: Yields of 3-month Treasury Bills at year t, and other variables are defined as before.

$H1_1$: $b_1 > 0$, $b_2 \neq 0$, $b_3 < 0$, $b_4 > 0$, $b_5 > 0$, $b_6 > 0$, $b_7 < 0$

TABLE 4-8

Market Reactions to SFAS No. 8 and No. 52 during 1976-80 and 1983-85
Variance Components Model of Equation 3.2' (DOI measured by ENT)

	Coefficient	t-Stat	Prob>|t|
a	-0.015	-0.31	0.75
b_1	0.444	6.75	0.00
b_2	-0.335	-10.24	0.00
b_3	-0.011	-1.62	0.10
b_4	0.0001	0.67	0.50
b_5	-0.003	-0.09	0.93
b_6	0.061	2.01	0.05
b_7	-0.002	-1.79	0.07
Adj R^2	N/A		
Variance Component for Cross-Sections			0.00098
Variance Component for Time-Series			0.00348
Variance Component for Error			0.06437
Regression M.S.E.			0.06431

$CAR_{jt} = a + b_1\ UE_{jt} + b_2\ D_{jt}{}^*\ UE_{jt} + b_3\ INT_t{}^*\ UE_{jt} + b_4\ DAF_{jt}{}^*\ UE_{jt} + b_5\ DOI_{jt} + b_6\ D_{jt}{}^*DOI_{jt} + b_7\ NOE_{jt} + e_{jt}$ (3.2')

INT_t: Yields of 3-month Treasury Bills at year t, and other variables are defined as before.

$H1_1$: $b_1 > 0$, $b_2 \neq 0$, $b_3 < 0$, $b_4 > 0$, $b_5 > 0$, $b_6 > 0$, $b_7 < 0$

TABLE 4-9

Market Reactions to Early vs. Late Adopters of No. 52 during 1976-80 Period
Pooled Time-Series Cross-Section Regression (DOI measured by ENT)

	Coefficient	t-Stat	Prob>|t|
a	0.018	0.41	0.69
b_1	0.142	6.69	0.00
b_2	0.219	3.32	0.00
b_3	-0.018	-5.62	0.00
b_4	-0.012	-0.33	0.74
b_5	-0.017	-1.05	0.29
b_6	-0.002	-1.46	0.14
Adj R^2	0.11		
F-statistic	14.95		0.00

$CAR_{jt} = a + b_1\ UE_{jt} + b_2\ D_{jt}^*\ UE_{jt} + b_3\ DAF_{jt}^*\ UE_{jt} + b_4\ ENT_{jt} + b_5\ D_{jt}^*ENT_{jt} + b_6\ NOE_{jt} + e_{jt}$ (3.1')

CAR_{jt}: 15-month cumulative abnormal returns for firm j,

UE_{jt}: Unexpected earnings for firm j,

DAF_{jt}: Dispersion of analysts' forecasts for firm j,

ENT_{jt}: Degree of internationalization for firm j measured by entropy,

NOE_{jt}: Number of analysts' forecasts available from IBES for firm j, which is a surrogate for the information environment of firm j,

D_{jt}: Dummy variable which is 1 if firm j was early adopter, and 0 if firm j was late adopter,

e_{jt}: Error term.

$H1_1$: $b_1 > 0$, $b_2 \neq 0$, $b_3 > 0$, $b_4 > 0$, $b_5 < 0$, $b_6 < 0$

TABLE 4-10

Market Reactions to Early vs. Late Adopters of No. 52 during 1983-85 Period
Pooled Time-Series Cross-Section Regression (DOI measured by ENT)

	Coefficient	t-Stat	Prob>|t|
a	-0.115	-1.92	0.06
b_1	0.017	2.50	0.00
b_2	0.024	0.80	0.42
b_3	0.0003	2.68	0.01
b_4	0.082	1.88	0.06
b_5	0.041	1.99	0.05
b_6	-0.0004	-0.27	0.79
Adj R^2	0.04		
F-statistic	3.30		0.00

$CAR_{jt} = a + b_1\ UE_{jt} + b_2\ D_{jt}*\ UE_{jt} + b_3\ DAF_{jt}*\ UE_{jt} + b_4\ ENT_{jt} + b_5\ D_{jt}*ENT_{jt} + b_6\ NOE_{jt} + e_{jt}$ (3.1')

CAR_{jt}: 15-month cumulative abnormal returns for firm j,

UE_{jt}: Unexpected earnings for firm j,

DAF_{jt}: Dispersion of analysts' forecasts for firm j,

ENT_{jt}: Degree of internationalization for firm j measured by entropy,

NOE_{jt}: Number of analysts' forecasts available from IBES for firm j, which is a surrogate for the information environment of firm j,

D_{jt}: Dummy variable which is 1 if firm j was early adopter, and 0 if firm j was late adopter,

e_{jt}: Error term.

TABLE 4-11

Information Content of Translation Adjustments during 1976-80 Period
Cross-Section Regression

Year	a_t	b_{1t}	b_{2t}	Adj R^2
76	-0.037	4.950	13.907	0.14
	(-1.06)	(4.08)#	(1.74)*	
77	-0.067	2.997	10.048	0.03
	(-2.72)#	(2.15)#	(1.43)*	
78	-0.121	6.053	9.864	0.16
	(-5.49)#	(5.11)#	(1.58)*	
79	-0.156	7.049	19.368	0.30
	(-6.00)#	(7.12)#	(2.48)#	
80	-0.012	0.692	5.154	0.00
	(-0.52)	(1.21)	(0.56)	

#: Significant at 0.05 level(one-tail) *: Significant at 0.1 level (one-tail)

$$CAR_{jt} = a_t + b_{1t}\ UE_{jt} + b_{2t}\ UTGL_{jt} + e_{jt} \quad (3.3)$$

CAR_{jt}: Cumulative abnormal returns for firm j at time t (t=1976-1980),

UE_{jt}: Unexpected earnings before translation gains/losses for firm j, t=1976-1980,

$UTGL_{jt}$: Unexpected translation gains/losses for firm j at time t (t=1976-1980).

TABLE 4-12

Information Content of Translation Adjustments during 1983-85 Period
Cross-Section Regression

Year	a_t	b_{1t}	b_{2t}	Adj R^2
83	0.026	1.267	0.702	0.04
	(1.18)	(2.59)#	(0.19)	
84	-0.072	0.345	-1.406	0.00
	(-3.65)#	(0.74)	(-0.35)	
85	0.027	1.529	2.713	0.11
	(0.79)	(4.19)#	(1.35)*	

#: Significant at 0.05 level(one-tail) *: Significant at 0.1 level (one-tail)

$CAR_{jt} = a_t + b_{1t}\ UE_{jt} + b_{2t}\ UTGL_{jt} + e_{jt}$ (3.3)

CAR_{jt}: Cumulative abnormal returns for firm j at time t (t= 1983-1985),

UE_{jt}: Unexpected earnings for firm j, t=1983-1985,

$UTGL_{jt}$: Unexpected translation gains/losses for firm j at time t (t = 1983-1985).

TABLE 4-13
Information Content of Translation Adjustments during 1976-80 Period
Variance Components Model of Equation 3.3 (DOI measured by ENT)

	Coefficient	t-Stat	Prob>|t|
a	-0.057	-2.74	0.00
b_1	3.106	7.58	0.00
b_2	14.081	4.18	0.00
Adj R^2	N/A		
Variance Component for Cross-Sections			0.00263
Variance Component for Time-Series			0.00152
Variance Component for Error			0.06834
Regression M.S.E.			0.06833

$CAR_{jt} = a_t + b_{1t}\ UE_{jt} + b_{2t}\ UTGL_{jt} + e_{jt}$ (3.3) (t=1976-1980)

CAR_{jt}: Cumulative abnormal returns for firm j at time t (t=1976-1980),

UE_{jt}: Unexpected earnings before translation gains/losses for firm j, t=1976-1980,

$UTGL_{jt}$: Unexpected translation gains/losses for firm j at time t (t=1976-1980).

TABLE 4-14
Information Content of Translation Adjustments during 1983-85 Period
Variance Components Model of Equation 3.3 (DOI measured by ENT)

	Coefficient	t-Stat	Prob>|t|
a	-0.006	-0.19	0.85
b_1	1.178	5.15	0.00
b_2	2.374	1.69	0.09
Adj R^2	N/A		
Variance Component for Cross-Sections			0.00661
Variance Component for Time-Series			0.00277
Variance Component for Error			0.05510
Regression M.S.E.			0.05512

$CAR_{jt} = a_t + b_{1t}\ UE_{jt} + b_{2t}\ UTGL_{jt} + e_{jt}$ (3.3)

CAR_{jt}: Cumulative abnormal returns for firm j at time t (t= 1983-1985),

UE_{jt}: Unexpected earnings for firm j, t=1983-1985,

$UTGL_{jt}$: Unexpected translation gains/losses for firm j at time t (t = 1983-1985).

TABLE 4-15
Information Content of Translation Adjustments during 1976-80 and 1983-85 Period
Variance Components Model of Equation 3.3 (DOI measured by ENT)

	Coefficient	t-Stat	Prob>|t|
a	-0.032	-1.94	0.05
b_1	1.732	8.14	0.00
b_2	12.678	3.79	0.00
b_3	-9.365	-2.58	0.01
Adj R^2	N/A		
Variance Component for Cross-Sections			0.00000
Variance Component for Time-Series			0.00167
Variance Component for Error			0.06872
Regression M.S.E.			0.06849

$CAR_{jt} = a_t + b_{1t}\, UE_{jt} + b_{2t}\, UTGL_{jt} + b_{3t}\, D_t{*}UTGL_{jt} + e_{jt}$ (3.3')

CAR_{jt}: Cumulative abnormal returns for firm j at time t (t=1976-1980 or 1983-1985),

UE_{jt}: Unexpected earnings before translation gains/losses for firm j, if t=1976-1980; and unexpected earnings for firm j, if t=1983-1985,

$UTGL_{jt}$: Unexpected translation gains/losses for firm j at time t (t=1976-1980 or 1983-1985),

D_t: Dummy variable which is 0 if t=1976-1980 and 1 if t=1983-1985.

TABLE 4-16
Correlation Matrix for Year = 1983

	NOS	ENT	FS	FNI	FA	TGL
NOS	1.000 (0.00)	0.409 (0.00)	0.171 (0.02)	0.176 (0.02)	0.240 (0.00)	-0.181 (0.03)
ENT		1.000 (0.00)	0.077 (0.30)	0.047 0.53)	0.022 (0.77)	-0.094 (0.25)
FS			1.000 (0.00)	0.883 (0.00)	0.454 (0.00)	-0.722 (0.00)
FNI				1.000 (0.00)	0.418 (0.00)	-0.815 (0.00)
FA					1.000 (0.00)	-0.302 (0.00)
TGL						1.000 (0.00)

PBRO > |RI| under H_0 in Parentheses

NOS: Number of foreign subsidiaries,

ENT: Entropy measure of foreign involvement,

FS: Foreign sales,

FNI: Foreign profit

FA: Foreign assets,

TGL: Translation Adjustments based on SFAS No. 52.

TABLE 4-17

Information Content of Translation Adjustments during 1976-80 Period
Cross-Section Regression

Year	a_t	b_{1t}	b_{2t}	b_{3t}	b_{4t}	Adj R^2
76	0.094	5.051	13.234	-0.034	-0.0026	0.17
	(0.64)	(4.24)#	(1.69)*	(-0.29)	(-2.34)#	
77	-0.047	2.840	8.949	-0.039	0.0009	0.01
	(-0.39)	(2.02)#	(1.24)*	(-0.42)	(1.05)	
78	-0.085	5.987	9.867	-0.062	0.0014	0.18
	(-0.96)	(5.00)#	(1.57)*	(-0.86)	(2.06)#	
79	-0.028	6.795	17.663	-0.105	0.0004	0.30
	(-0.22)	(6.66)#	(2.16)#	(-1.11)	(0.46)	
80	-0.079	0.506	1.661	0.020	0.0012	0.00
	(-0.69)	(0.86)	(0.17)	(0.23)	(1.43)	

t-statistics in parentheses

#: Significant at 0.05 level(one-tail) *: Significant at 0.1 level (one-tail)

$CAR_{jt} = a_t + b_{1t}\, UE_{jt} + b_{2t}\, UTGL_{jt} + b_{3t}\, ENT_{jt} + b_{4t}\, NOS_{jt} + e_{jt}$ (3.3")

CAR_{jt}: Cumulative abnormal returns for firm j at time t (t=1976-1980),

UE_{jt}: Unexpected earnings before translation gains/losses for firm j, t=1976-1980,

$UTGL_{jt}$: Unexpected translation gains/losses for firm j at time t (t=1976-1980).

TABLE 4-18

Information Content of Translation Adjustments during 1983-85 Period
Cross-Section Regression

Year	a_t	b_{1t}	b_{2t}	b_{3t}	b_{4t}	Adj R^2
83	-0.018	1.222	0.425	0.0799	-0.0018	0.05
	(-0.17)	(2.51)#	(0.11)	(0.93)	(-2.21)#	
84	-0.072	0.417	-0.646	-0.046	0.0017	0.02
	(-0.70)	(0.87)	(-0.16)	(-0.55)	(2.38)#	
85	-0.260	1.571	0.467	0.208	0.0011	0.15
	(-2.03)#	(4.33)#	(0.22)	(2.00)#	(1.17)	

t-statistics in parentheses

#: Significant at 0.05 level(one-tail) *: Significant at 0.1 level (one-tail)

$CAR_{jt} = a_t + b_{1t}\ UE_{jt} + b_{2t}\ UTGL_{jt} + b_{3t}\ ENT_{jt} + b_{4t}\ NOS_{jt} + e_{jt}$ (3.3")

CAR_{jt}: Cumulative abnormal returns for firm j at time t (t=1983-1985),

UE_{jt}: Unexpected earnings for firm j, t=1983-1985,

$UTGL_{jt}$: Unexpected translation gains/losses for firm j at time t (t=1983-1985).

TABLE 4-19

Association between Accounting Information and Foreign Involvement of MNCs
Estimated during 1976-1980 for Equation 3.4 (DOI measured by ENT and NOS)

	Coefficient	t-Stat	Prob>|t|
a	0.110	1.03	0.31
b	-0.101	-1.79	0.07
c	-0.678	-2.43	0.02
d_1	0.057	0.86	0.39
d_2	0.0008	1.07	0.29
Adj R^2	0.04		
F-statistic	2.48		0.05

$$VM(TGL_8)_i = a + b\,\beta_i + c\,\gamma_i + d_1\,ENT_i + d_2\,NOS_i + e_i \qquad (3.4)$$

VM_i: Volatility measure of accounting translation gains/losses based on SFAS No. 8 for firm i,

β_i: Systematic risk for firm i,

γ_i: Sensitivity of stock returns of firm i to foreign exchange risk,

ENT_i: A measure of degree of foreign involvement of firm i.

NOS_i: Number of foreign subsidiaries of firm i.

$H5_1$: $b > 0, c > 0, d_1 < 0, d_2 < 0$

TABLE 4-19 (Continued)
Correlation Matrix

	VM	NOS	ENT	BETA	GAMMA
VM	1.000 (0.00)	0.122 (0.13)	0.124 (0.12)	-0.085 (0.28)	-0.122 (0.11)
NOS		1.000 (0.00)	0.408 (0.00)	-0.215 (0.00)	0.145 (0.05)
ENT			1.000 (0.00)	-0.158 (0.03)	0.058 (0.44)
BETA				1.000 (0.00)	-0.427 (0.00)
GAMMA					1.000 (0.00)

PROB >|R| in Parentheses.

TABLE 4-20

Association between Accounting Information and Foreign Involvement of MNCs
Estimated during 1983-1986 for Equation 3.4 (DOI measured by ENT and NOS)

	Coefficient	t-Stat	Prob>|t|
a	0.539	0.84	0.41
b	-0.621	-1.84	0.06
c	-0.493	-0.50	0.62
d_1	0.333	0.75	0.45
d_2	0.0082	1.85	0.06
Adj R^2	0.04		
F-statistic	2.47		0.05

$VM(TGL_8)_i = a + b\,\beta_i + c\,\gamma_i + d_1\,ENT_i + d_2\,NOS_i + e_i$ (3.4)

VM_i: Volatility measure of accounting translation gains/losses based on SFAS No. 52 for firm i,

β_i: Systematic risk for firm i,

γ_i: Sensitivity of stock returns of firm i to foreign exchange risk,

ENT_i: A measure of degree of foreign involvement of firm i.

NOS_i: Number of foreign subsidiaries of firm i.

$H5_1$: $b > 0, c > 0, d_1 < 0, d_2 < 0$

TABLE 4-20 (Continued)
Correlation Matrix

	VM	NOS	ENT	BETA	GAMMA
VM	1.000 (0.00)	0.195 (0.02)	0.123 (0.13)	-0.140 (0.08)	-0.071 (0.38)
NOS		1.000 (0.00)	0.409 (0.00)	-0.048 (0.52)	-0.155 (0.04)
ENT			1.000 (0.00)	0.004 (0.96)	0.006 (0.93)
BETA				1.000 (0.00)	-0.028 (0.69)
GAMMA					1.000 (0.00)

PROB >|R| in Parentheses.

CHAPTER 5
USING ACCOUNTING INFORMATION TO HEDGE AGAINST FOREIGN EXCHANGE RISK: SFAS NO. 8 VS. NO. 52

5.1 Introduction

The purpose of this chapter is two-fold. First, the possibility of forming hedge portfolios based on MNC stocks is examined. Second, through the usefulness of accounting translation information in forming hedge portfolios, the information content of SFAS No. 8 and No. 52 is examined to provide a potential explanation of cash flow implication of translation gains/losses, which supplements the empirical results reported in Chapter 4.

The objective of financial reporting is to provide information that is useful to investment and credit decisions; therefore, it is important to evaluate the effects of accounting policies based on their usefulness to investors and creditors. Traditional capital market research in accounting considers the information content of certain events and infers the effects of accounting policies based on the stock market reactions to those events. This chapter takes a different approach by examining how accounting information provided by SFAS No. 8 and No. 52 might help protect individual investor's hedging portfolios against exchange risk. In addition, this analysis also provide another potential explanation of cash flow impact from SFAS No. 8 and/or No. 52.

Intuitively, a hedge portfolio works best when its correlation with the state variable being hedged is high. If hedge portfolios based on accounting

translation information can be constructed so as to have high correlation with exchange rate, it suggests that accounting information itself is highly correlated with exchange risk. Since there should be no correlation between accounting exposure and economic exposure a priori, an observed significant correlation between these two therefore implies some artificial manipulation of accounting exposure at firm level, i.e. hedging accounting exposure by the management. While this is not a direct test of hedging at firm level, it does provide additional evidence explaining the cash flow impact from accounting translation methods.

The following section provides a theory for hedging from an individual investor's viewpoint. Section 5.3 examines the possibility of using common stocks of multinational corporations as hedge portfolios against foreign exchange risk. The methodology of constructing hedge portfolios and the empirical results will be discussed in the following sections. Finally, the implications of usefulness of foreign currency translation related to hedging exchange risk will be considered.

5.2 Foreign Exchange Risk and Demand for Foreign Assets

The role of exchange risk in international investment decisions centers around assumptions on consumption preferences of investors. Several authors (e.g. Eaker (1981), and Eun (1981)) have argued that exchange risk should be measured in terms of the variability of the real purchasing power of the return generated from foreign investment over a global mix of goods. For an investor who consumes a mix of foreign and home products, or for a multinational firm with extensive operations outside its home country, a consumption basket which reflects the relative importance of home and

foreign products is the proper deflator in measuring investment performance. In the U.S., consumers rely so much on imports from other countries, it is reasonable to use a global consumption basket for investment evaluation.

Choi (1984) has shown that changes in investors' consumption preferences can affect their international asset choice. The effect of changes in the consumption basket on the share of foreign asset demand has been derived as follows (see Choi (1984), p293):

$$\frac{\partial x}{\partial a} = \frac{1}{S}[\frac{1}{A}(\frac{\partial M_{r^*}}{\partial a} - \frac{\partial M_r}{\partial a}) + (\frac{\partial S_r^2}{\partial a} - \frac{\partial S_{rr^*}}{\partial a})]$$

and this implies

$$\frac{\partial x}{\partial a} > 0 \text{ if } \underbrace{\frac{\partial M_{r^*}}{\partial a} > \frac{\partial M_r}{\partial a}}_{\text{(speculative demand)}} \text{ and } \underbrace{\frac{\partial S_r^2}{\partial a} > \frac{\partial S_{rr^*}}{\partial a}}_{\text{(hedging demand)}}$$

x: the share of foreign investment,

a: the share of foreign goods in the consumption basket,

S: the sum of domestic and foreign returns variance,

A: the measure of relative risk aversion,

M_{r^*}: the expected real returns from foreign investment,

M_r: the expected real returns from domestic investment,

S_r^2: the variance of domestic returns,

S_{rr^*}: the covariance of domestic and foreign real returns.

The intuitive explanation of Choi's result is that when investors increase the consumption of foreign goods, they will invest more abroad, if

the changing demand pattern, in terms of the new consumption basket as deflator, leads to higher real returns abroad than in the United States, and if the covariance of the two returns is less affected than the variance of the domestic returns by this change in consumption preference. This suggests that foreign exchange risk will determine the relationship between foreign and domestic real returns, and also the covariance of the two returns, and therefore will affect investors' demand for foreign asset. Another important point raised by Choi is that even under the assumption of purchasing power parity, the exchange risk still exists in another form. The purchasing power parity assumption will only transform exchange risk to inflation risk as long as these variables are stochastic in nature. The implication is that even if purchasing power parity correctly explains the exchange rate behavior, this does not assume away the exchange risk, which will be in the form of unexpected inflation differential, instead.[22]

Under reasonable conditions provided by Choi (1984), it is in the best interest of investors to invest abroad when their consumption of foreign goods has increased because the uncertainty of foreign goods can be hedged by the foreign investment. This provides theoretical justification of international diversification from a consumption viewpoint, and the motivation to hedge against foreign exchange risk.[23]

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22 The implication is that foreign currency risk is not diversifiable, and therefore it should be reflected in asset prices.

23 From practical viewpoint, the following two examples may also explain why consumers want to hedge against foreign exchange risk. First, a consumer who plans to buy foreign products, but with U.S. dollar income, may have incentive to hedge the fluctuation of exchange rate. Second, a consumer with foreign income, but only consumes domestic goods, may also want to remove the probability that the value of his wealth will fluctuate with exchange rate.

5.3 The Role of MNCs in Financial Market and Foreign Exchange Exposure

This section briefly reviews current research of MNCs and the distinction between accounting and economic exposure, which provides the link to the theoretical framework in the next section.

5.3.1 MNCs and International Diversification

There is a rather convincing body of literature which indicates that internationally diversified portfolios are superior to portfolios which are diversified within a single national market, in that they provide higher risk-adjusted returns to their investors. However, evidence regarding the performance of MNCs relative to the performance of domestic firms, which may be viewed as portfolios of internationally diversified assets, is contradictory.

Agmon and Lessard (1977) found that the higher the degree of an MNC's international involvement, the lower its market-assigned measure of systematic risk. Jacquillant and Solnik (1979), on the other hand, found that the effect of foreign influence on the systematic risk of MNC is limited compared with the extent of their foreign involvement. They concluded that investing in multinationals is a poor substitute for international diversification. Brewer (1981) concluded that the security market line for MNCs is statistically indistinguishable from the security market line for domestic firms although his tests are limited to a single time period. Finally, Errunza and Senbet (1981 and 1984) have arrived at a different conclusion. Using a value-based test, they concluded that there is a positive relationship between the degree of international involvement and excess market value. In

a more recent study, Fatemi (1984) provided evidence which indicates that risk-adjusted returns realized by the shareholders are identical across the domestic and multinational portfolios, but the evidence also suggests that, for multinationals, the higher the degree of international involvement, the lower the systematic risk.

The contradictory evidence so far seems to suggest that it may be necessary to distinguish real asset diversification from financial asset diversification.[24] Although MNCs may not result in international diversification to the same extent as internationally diversified portfolios do, practical concerns of barriers to international investment may prevent investors from holding a truly internationally diversified portfolio. There is a wide variety of barriers to international investment that play a significant role in how investors allocate their wealth among risky assets. Barriers to international investment can take the form, for example, of foreign exchange rate restrictions, explicit limits on capital flows, differential taxes, holding costs, risks of expropriation, and so on.

By investing in portfolios of MNCs, investors can circumvent barriers to international investment and achieve a reasonable degree of international diversification. Stulz (1984) argues that in the presence of barriers to international investment, multinational firms can take advantage of barriers to international investment in numerous ways through financial

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24 If investors can diversify internationally through other channels, then we may not observe any excess returns of MNCs over their domestic counterparts. However, MNCs may have monopoly rents in their foreign markets, which should be reflected in their valuation. For further details, see Errunza and Senbet (1981).

transactions.[25] This chapter examines whether investors can invest in portfolios of MNCs to hedge against foreign exchange risk, and therefore provides an alternative explanation of the role of MNCs in the capital market.

5.3.2 Foreign Exchange Exposure: Accounting vs. Economic Exposure

When a firm has assets or liabilities denominated in a foreign currency, or is doing business in a foreign currency, profitability will be influenced by changes in the value of that currency relative to the home or reporting currency. Foreign currency exposure is the possibility that a company will lose or gain because of a change in exchange rates.

According to Shapiro (1982), accounting exposure arises from the need to convert the results of foreign operations from the local currencies involved to the home or reporting currency. When exchange rate changes occur, this translation or restatement of the various accounts denominated in the foreign currency leads to a new value for the accounting measurement of the dollar value of the firm's investment in the foreign subsidiary, and therefore a change in earnings. The possible extent of this change in earnings, reported as translation gains or losses, is measured by the translation (or accounting) exposure figures which are defined differently under Statement of Financial Accounting Standards (SFAS) No. 8 and No. 52.

Economic exposure is a more abstract concept than accounting exposure. Shapiro separates economic exposure into transaction exposure and real operating exposure. Transaction exposure results from the possibility of exchange gains or losses, upon settlement at a future date, of transactions

25 Some countries do not allow foreigners to invest in their stock markets; however, they do allow foreign direct investment or joint venture with local firms.

already entered into and denominated in a foreign currency. Some of these unsettled transactions, for example, foreign currency denominated accounts receivable and payable, are already listed on the firm's balance sheet, while other obligations, such as contracts for future sales or purchases, are not.

Real operating exposure, on the other hand, arises because currency fluctuations, in combination with price changes, could alter the amounts and risks of a firm's future revenue and cost streams. Evaluating this exposure requires a longer-term perspective, viewing the firm as an ongoing concern with operations whose cost and price competitiveness could be affected by exchange rate changes. Since most authors in the international finance literature treat real operating exposure as a synonym of economic exposure and because the difference between accounting and transaction exposure is just a timing difference, economic exposure will be defined as real operating exposure in this study, and transaction exposure will be considered as part of the accounting exposure.

In summary, accounting exposure only considers the change of accounting valuation due to exchange rate changes, while economic exposure considers the change of future cash flows due to current exchange rate movements. These two concepts have very different meanings and have created a lot of controversies in foreign currency accounting. Due to the limitations of historical cost valuation, the accounting profession continues to provide accounting exposure information, which may or may not reflect the real economic exposure of MNCs. In this chapter, the usefulness of accounting and market information in forming hedge portfolios will be examined.

5.4 Construction and Evaluation of Hedge Portfolios

This section explains the basic methodology and testable hypotheses. The objective of this chapter is to evaluate SFAS No. 8 and No. 52 based on their usefulness in forming hedge portfolios. This approach may provide an alternative in examining the information content of different accounting policies.

5.4.1 Methodology Background

The Sharp-Lintner capital asset pricing model abstracts from reality by assuming that consumers act to maximize the expected value of a utility function whose arguments are consumption at time 0 and nominal wealth at time 1. In a single period framework, uncertainty of state variables does not concern consumers. More general models are developed in a multiperiod setting (e.g. see Long (1974)). In the single period model, investors hold only combinations of a riskless asset and a share of the market portfolio. In a multiperiod setting, however, investors may also hold long or short positions in certain hedge portfolios. The basic hypothesis underlying the concept of hedge portfolios is that each security return is affected not only by the return to the market as a whole but also by changes in investment and consumption opportunities due to changes in state variables. Hedge portfolios are used in the multiperiod setting to reduce risk associated with unexpected changes of state variables that affect the utility of investors.

If investors' utility is conditional only on the state variable S, then the multiperiod CAPM can be expressed as follows:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \gamma_j \Delta S_t + e_{jt} \qquad (5.1)$$

The hedge portfolios underlying the generalized CAPM are constructed so that their covariance with each security's return is identical to the covariance between the state variable and that security's return. If the covariance matrix of returns and the vector of covariances with the unanticipated changes in the state variable are known, then the hedge portfolio is the vector H where

$$\Sigma H = C \quad \text{or} \quad H = \Sigma^{-1} C \quad (5.2)$$

where Σ = the covariance matrix of security returns, and C = the vector of covariances between security returns and unanticipated changes in state variable S. H is the portfolio which theoretically should be combined with the market portfolio for hedging purposes. Note that if a portfolio whose returns are perfectly correlated with unanticipated changes in the state variable S exists, H will have this property.

Alternatively, the hedge portfolios used to hedge against ΔS_t can be found by considering the following cross-sectional regression:

$$R_{jt} = a_t + b_t \beta_j + c_t \gamma_j + e_{jt} \quad (5.3)$$

where R_{jt}, β_j and γ_j are defined earlier, a_t, b_t, and c_t are regression coefficients, and e_{jt} is a disturbance term. The estimated coefficients a_t, b_t, and c_t can be interpreted as expected portfolio returns (see Fama and MacBeth (1973), Schipper and Thompson (1981), and Bernard (1984)).[26] The intuition

26 The coefficients from the multiple regression (5.3) are identical (up to a multiplicative scalar) to the coefficients one would obtain were the hedge

behind this methodology is that hedge portfolios are constructed based on the sensitivity of stock returns to state variable, ΔS, i.e. the more sensitive the stock price to the state variable, the more weight in the hedge portfolio. The coefficient c_t can then be viewed as the realized return on the hedge portfolio due to the nature of OLS regression. The success of forming hedge portfolios depends on the estimation and stability of γ_j, which can be interpreted as the sensitivity of stock returns to unanticipated changes of state variable S or the so-called hedge ratio.

5.4.2 Estimation of Sensitivity of Stock Returns to Exchange Risk

In this study, exchange risk is defined as the unanticipated U.S. dollar movement against currencies of its major trading partners. From the consumer's viewpoint, this definition of exchange risk is more realistic than any single foreign exchange movement. The research question is whether one can construct hedge portfolios, using common stocks of MNCs, against this foreign exchange risk. As mentioned in the previous section, the performance of hedge portfolios depends on the stability of each component's sensitivity to exchange risk. The ideal hedge instrument is a futures contract of an index of foreign currencies of U.S. major trading partners, which will have a perfect correlation with unanticipated exchange risk. However, since no such futures contract is currently available, we have to use other financial assets to construct the hedge portfolios. This is the concept of cross-hedging (see Anderson and Danthine (1981), and Eaker and Grant(1987)).

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portfolio returns substituted for the unanticipated changes in the state variable. See Schipper and Thompson (1981), footnote 7, p315.

Both firms and investors can use cross-hedging to manage foreign currency risk when there are no futures or forward markets in a particular currency. Cross-hedging is important because it greatly expands the opportunity set of hedging alternatives. There are only a limited number of currencies which are traded actively in futures markets or for which bank forward contracts are typically available. The effectiveness of cross-hedging depends on the successful identification of highly correlated assets, the measurement of hedge ratios, and the ratios' stability over time. Since most U.S. MNCs have either subsidiaries or business operations in countries which are the major trading partners of U.S., it is most likely that their stock returns are sensitive to the foreign exchange risk defined earlier, and therefore they are natural candidates for hedge portfolios. In this study, it is crucial to identify MNCs whose stock returns have high correlations with exchange risk. The following two approaches will be employed to estimate the sensitivity γ_j.

5.4.3 Using Security Price Data

The traditional approach employed in the accounting and finance literature to estimate β_j and γ_j is to run a set of firm-specific time series regressions of the following form:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \gamma_j ue_t + e_{jt} \qquad (5.4)$$

The estimates of β_j and γ_j will be used to construct a hedge portfolio by running the following cross-sectional regression at each time period t:

$$R_{jt} = a_t + b_t \beta_j + c_t \gamma_j + e_{jt} \quad (5.5)$$

The estimate of c_t is equal to the hedge portfolio return at time t. While this method has been applied widely in the finance literature, it relies on the stability of γ_j over time, and does not consider firm-specific information which may be helpful in predicting sensitivity of stock returns. The second approach is designed to utilize firm-specific information conveyed by foreign currency translation in constructing hedge portfolios.

5.4.4 Using Accounting Information

Although equations (5.4) and (5.5) provide the basic methodology in constructing hedge portfolios, they do not consider the role of accounting information in the process. Each MNC has its unique position in foreign operations, therefore its sensitivity to foreign exchange risk may be firm-specific (see Bernard (1986) for a similar argument on inflation). The research question in this chapter focuses on whether accounting translation gains/losses provide any firm-specific information of foreign exchange risk and whether this information is useful in constructing hedge portfolios. Since the link between accounting information and unexpected exchange risk is not straightforward, the following valuation model, which assumes two periods and that exchange rates following random walk, should describe the potential relationship:

$$TGL_{8} = \sum_{i=1}^{n} NMA_i \times (e_{it} - e_{i,t-1}) = \sum_{i=1}^{n} NMA_i \times u\, e_{it} \qquad (5.6)$$

$$TGL_{52} = \sum_{i=1}^{n} NA_i \times (e_{it} - e_{i,t-1}) = \sum_{i=1}^{n} NA_i \times u\, e_{it} \qquad (5.7)$$

NMA_i represents net monetary position in country i, NA_i is net assets in country i. Therefore, translation gains/losses are functions of unexpected exchange rates weighted by either net monetary position (SFAS No. 8) or net assets (SFAS No. 52) in each country. Based on the evidence in Chapter 4, accounting translation adjustments do provide valuation impacts. Therefore, the firm value is a function of translation adjustments, and the following relationship can be hypothesized:[27]

$$\frac{\partial V_{j,t}}{\partial ue_t} = \frac{\partial f(\Delta TGL_{j,t})}{\partial ue_t} = \gamma_j = g(\Delta TGL_{j,t}) \qquad (5.8)$$

The implication is that γ_j can be estimated as a function of translation gains/losses if they have valuation impacts. Even though the exact functional form of TGL_j and γ_j is unknown, empirical evidence from Chapter 4 supports the functional form given in Equation 5.8. Therefore, an alternative measurement of γ_j and the returns of hedge portfolios based on accounting translation gains/losses can be expressed in a cross-sectional regression as the following:

$$R_{jt} = a_t + b_t \beta_j + c_t\, g(\Delta TGL_{jt}) + e_{jt} \qquad (5.9)$$

$$\text{Where } \gamma_j = g(\Delta TGL_{jt}) \qquad (5.9.1)$$

The major contribution of Equation (5.9) is that sensitivity to exchange risk γ_j will be measured using accounting information, and this provides not only an opportunity to evaluate information provided by SFAS No. 8 and No. 52

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27 ΔTGL is an accounting measure of exchange risk which itself is a first difference concept.

based on their respective hedging performance but also a possible explanation of potential valuation impacts of SFAS No. 8 and No. 52. Sensitivity to exchange risk based on security price, on the other hand, can be served as a benchmark in evaluating potential hedge portfolios performance.

5.5 Testable Hypotheses

The purpose of this chapter is to evaluate two controversial accounting policies based on their potential hedging effectiveness against unexpected foreign exchange risk. The argument of different translation methods of foreign currencies can be evaluated from information usefulness perspective instead of traditional event studies. A priori, it is difficult to predict which accounting translation method would provide better hedging performance. However, translation gains/losses were included in net income under SFAS No. 8 requirement, but not under SFAS No. 52. Therefore, stock returns may be more sensitive to information provided by SFAS No. 8 than to No. 52. However, this argument alone does not support the contention of stronger association between hedge portfolios returns and exchange risk. Also, the evidence from Chapter 4 seems to suggest stronger association between stock returns and accounting information based on SFAS No. 8. Based on the above discussion and evidence in Chapter 4, Hypothesis 6 can be tested as the following expectation:

$$H6_0: r_{52}(ue_t, c_t) = r_8(ue_t, c_t)$$

$$H6_A: r_{52}(ue_t, c_t) < r_8(ue_t, c_t)$$

c_t is the return of hedge portfolio at time t and estimated from equation 5.9 and 5.9.1. Then c_t is correlated with ue_t to test Hypothesis 6. Subscripts 52 and 8 refer to correlation coefficients based on information of SFAS No. 52 and No. 8.

5.6 Results and Discussion

The same set of sample firms described in Chapter 3 was used in this chapter and additional data were collected for the sample firms. The foreign exchange risk in this study is defined as the unexpected movements of U.S. dollar against its major trading partners. Treasury Bulletin published by Treasury Department provides this information. Other firm specific variables were collected from CRSP, Compustat, Value Line data bases, and annual reports.

The estimation of γ and constructing hedge portfolios are divided into two separate periods, one from January, 1976 to December, 1980 when SFAS No. 8 was in effect, the other from January, 1983 to December, 1986 when SFAS No. 52 was in effect. The transition periods for SFAS No. 52 were eliminated to avoid any confounding factors. γ_t was estimated using information of estimation periods prior to and subsequent to period t similar to Bernard (1984). The standard deviation of accounting translation gains/losses is operationalized as the accounting estimation of γ, also applied in Chapter 4. Table 5-1 provides the comparison of hedge portfolios based on SFAS No. 8 and No. 52. The correlation coefficient between unexpected exchange risk and hedge portfolio returns of SFAS No. 8 is -0.27 and significant at 3% level. On the other hand, the correlation between unexpected exchange risk and hedge portfolio returns of SFAS No. 52 is -0.21 and significant only at 13% level. Therefore, $H4_0$ can be rejected with some comfort. The results seem to suggest

that hedging performance based on SFAS No. 8 is better than that based on SFAS No. 52. Once again, by using a different methodology, the empirical evidence suggests a significant information content from the disclosure of SFAS No. 8.

For comparison purpose, the hedging performance based on security price is presented in Table 5-2. Although security price information provides better correlation between unexpected foreign exchange risk and hedge portfolios returns, the sign is positive which is different from the sign based on accounting translation information.[28] During the first period (January, 1976 to December, 1980), the correlation coefficient is 0.82, while correlation coefficient is 0.77 during the second period (January, 1983 to December, 1986). Both are significant at 1% level. It is not surprising that the correlation is much higher using security price data since accounting information is just one of the competing information sources in pricing securities. However, it is also important to determine the stability of γ in constructing hedge portfolios. Table 5-3 presents results of hedging performance in one period based on estimation of γ from another period. The correlation is low and insignificant and therefore suggests instability of γ during different time periods, which is a problem not unique to this study.[29]

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28 For hedging purpose, the sign of correlation is not crucial as long as it is stable over time. If the sign is positive as in this case, we can always sell short on hedge portfolios. However, different signs of correlation coefficients may suggest different information provided by accounting and market variables.

29 Schipper and Thompson (1981), for example, encountered the same problem in an attempt to hedge inflation.

5.7 Costs of Hedging as an Explanation of Information Content of SFAS No. 8

With an alternative approach to studying the information content of SFAS No. 8 and No. 52, the evidence once again is consistent with the notion that both stock returns and exchange risks are significantly correlated with information provided by SFAS No. 8. Since translation gains/losses based on SFAS No. 8 do not correlate with benefits and risks of foreign involvement, the information content of SFAS No. 8 may be due to the cash flow impacts of hedging accounting exposure. If managers of MNCs did consume resources in hedging accounting exposure, translation gains/losses reported in the financial statements may well represent the undiversifiable portion of exchange risks, which is captured by the standard deviation in this study. A negative correlation between this undiversifiable exchange risks and the sensitivity of stock returns to exchange risks as observed in Chapter 3 is consistent with the notion that managers were hedging accounting exposure when SFAS No. 8 was in effect. Since there is no direct way of testing managerial hedging behavior with current disclosure requirements, hedging performance of MNCs' stocks can be interpreted as an indirect way of testing managerial hedging behavior. Theoretically, monetary/nonmonetary translation method required by SFAS No. 8 should have low or no correlation with exchange rate movements cross-sectionally, since each firm may have a different net monetary position and accounting exposure. Therefore, accounting translation information based on SFAS No. 8 should not provide any improvement in forming hedge portfolios. However, the empirical evidence from the previous section clearly establishes the link between exchange risks and undiversifiable exchange risks embedded in accounting

translation information. This can be established only if there has been a realignment of translation information with exchange rate movements cross-sectionally. And this is consistent with the notion of managerial hedging of accounting exposure when SFAS No. 8 was in effect. Similar situation was not observed after SFAS No. 52 became official, and that can be interpreted as hedging accounting exposure was not significant during post No. 52 period.

In summary, the analysis in this chapter has led to the following conclusions:

1. Consistent with previous evidence, information content of SFAS No. 8 is still significant when a different methodology is used. This suggests that the evidence regarding SFAS No. 8 is robust.

2. The valuation impacts of SFAS No. 8 seems to come from the cash flow implications due to hedging accounting exposure. However, this study did not test this proposition directly. Instead, a different explanation of valuation impacts was ruled out. Further studies are necessary to confirm this hypothesis.

TABLE 5-1
Using Accounting Information to Estimate γ

	$r_8(ue_t, c_t)$	$r_{52}(ue_{t-}, c_t)$
Pearson Correlation	-0.277	-0.216
	(0.032)	(0.139)
Spearman Correlation	-0.330	-0.207
	(0.009)	(0.157)
PROB > |R| in parentheses	(N=60)	(N=48)

TABLE 5-2
Using Security Price Information to Estimate γ

	$r_{76\text{-}80}(ue_{t\_}, c_t)$	$r_{83\text{-}86}(ue_{t\_}, c_t)$
Pearson Correlation	0.819	0.775
	(0.00)	(0.00)
Spearman Correlation	0.810	0.676
	(0.00)	(0.00)
PROB > |R| in parentheses	(N=60)	(N=48)

TABLE 5-3
Using Security Price Information to Estimate γ

	$r_{76\text{-}80}(ue_{t-}, c_t)$	$r_{83\text{-}86}(ue_{t-}, c_t)$
	γ estimated during 83-86	γ estimated during 76-80
Pearson Correlation	-0.022	0.008
	(0.867)	(0.95)
Spearman Correlation	-0.103	-0.020
	(0.430)	(0.890)
PROB > |R| in parentheses	(N=60)	(N=48)

CHAPTER 6
SUMMARY AND CONCLUSION

In this study, the impact of accounting regulations of foreign currency translation is examined from several different perspective. Previous studies in this area provide mixed results and fail to explain why those results were expected. Three major areas are explored in this study: (1) the time-series and cross-sectional relationship between firm value and its accounting exposure based on either SFAS No. 8 or No. 52; (2) the link between accounting exposure measured by either SFAS No. 8 or No. 52 and economic exposure measured by market information; and (3) the use of accounting information provided by SFAS No. 8 and SFAS No. 52 to improve the choice of hedge portfolios as an alternative evaluation criterion of accounting policies.

The first issue concerns differential market reactions to foreign currency translations based on differential earnings quality. First, differential information content of earnings of early vs. late adopters of SFAS No. 52 is examiined. An alternative way of testing differential content of earnings is by examining temporal differences in the association of earnings and prices based on the required foreign currency translation method when the earnings were announced. This is accomplished by introducing a dummy to distinguish between the 1976-1980 (SFAS No. 8) and the 1983-1986 (SFAS No. 52) periods. The evidence from this part of analysis is contradictory. While there was a stronger association between security price and earnings of early adopters of SFAS No. 52, the second part of analysis suggests a stronger association between earnings during 1976-1980 period and security price. The

additional analysis suggests that early adopters are a self-selected group of firms which demonstrate higher earnings response coefficient than their counterpart.

In order to validate the above analysis, a direct association between translation gains/losses and security price is considered in the second part of chapter 4. The results suggest stronger association between translation gains/losses based on SFAS No. 8 and stock returns. While the second part of analysis corroborates the earlier analysis, the source of cash flow impact from SFAS No. 8 is still unclear.

Overall, the evidence shows higher association between security price and the information provided by SFAS No. 8 than is the case with No. 52. This is consistent with the argument that translation gains/losses based on SFAS No. 8 provides cash flow implications to investors.

The second issue is to identify possible sources of potential cash flow implications from translation gains/losses. One possible source of cash flow implications is that translation gains/losses reflect the risks and benefits of foreign operations of multinational corporations. The last part of analysis of chapter 4 considers the possibility that information provided by SFAS No. 8 reflects the economic reality of MNC's foreign operations. However, this hypothesis was rejected and the evidence seems to suggest a negative correlation between accounting information and economic reality. This leads to the following issue.

The final issue concerns the hedging performance based on accounting information provided by SFAS No. 8 and No. 52. Hedging performance based on SFAS No. 8 was found to be statistically significant. This confirms previous evidence that, while translation gains/losses based on SFAS No. 8 provide no direct cash flow implication, the implication comes from managerial hedging

accounting exposure at firm level instead of reflecting economic reality of foreign operations of multinational corporations. In summary, the analysis in chapter 5 contributes to the following:

1. Consistent with previous evidence, information content of SFAS No. 8 is still significant based on a different methodology. This suggests that the evidence regarding SFAS No. 8 is robust.

2. The valuation impacts of SFAS No. 8 seems to come from the cash flow implications due to hedging accounting exposure. However, this study did not test this proposition directly. Instead, another possible explanation of valuation impacts was ruled out.

Based on the evidence from this study, the implementation of SFAS No. 8 did have a cash flow impact on security price. While this is not the first study documenting this impact, it does point out that the cash flow impact came from hedging accounting exposure at firm level. Whether this hedging behavior is rational is open to debate, it is consistent with the argument by Amershi and Sunder (1987). The evidence also confirms earlier studies that managers stopped hedging accounting exposure during post SFAS No. 8 period.

While this study suggests hedging costs as the possible explanation of stock price reactions to SFAS No. 8, it is difficult to test this proposition directly due to the lack of data. Another alternative method to test the hedging behavior of MNCs is to examine the motivation for managers to hedge accounting exposure instead of economic exposure. Recent advancement in contracting theory provides the opportunity to extend this line of research in the future.

REFERENCES

Abdel-khalik, A. R. "The Entropy Law, Accounting Data, and Relevance to Decision-Making." Accounting Review (April 1974): 271-83.

Agmon, T., and D. R. Lessard. "Investor Recognition of Corporate International Diversification." Journal of Finance (September 1977): 1049-56.

Aliber, R. Z., and C. P. Stickney. "Accounting Measures of Foreign Exchange Exposure: The Long and Short of It." Accounting Review (January 1975): 44-57.

Amershi, A. H., and S. Sunder. "Failure of Stock Prices to Discipline Managers in a Rational Expectations Economy." Journal of Accounting Research (Autumn 1987): 177-95.

Anderson, R., and J. Danthine. "Cross Hedging." Journal of Political Economy (December 1981): 1182-96.

Atiase, R. K. "Predisclosure Information, Firm Capitalization, and Security Price Behavior Around Earnings Announcements." Journal of Accounting Research (Spring 1985): 21-36.

Ayres, F. L. "A Comment on Corporate Preferences for Foreign Currency Accounting Standards." Journal of Accounting Research (Spring 1986a): 166-69.

_____. "Characteristics of Firms Electing Early Adoption of SFAS No. 52." Journal of Accounting and Economics (June 1986b): 143-58.

Beaver, W., and M. Wolfson. "Foreign Currency Translation and Changing Prices in Perfect and Complete Markets." Journal of Accounting Research (Autumn 1982): 528-50.

_____. " Foreign Currency Translation Gains and Losses: What Effect Do They Have and What Do They Mean?" Financial Analysts Journal (March-April 1984): 28-36.

Bernard, V. L. "The Use of Market Data and Accounting Data in Hedging against Consumer Price Inflation." Journal of Accounting Research (Autumn 1984): 445-66.

_____. "Unanticipated Inflation and the Value of the Firm." Journal of Financial Economics (March 1986): 285-321.

Breeden, D. "An Intertemporal Asset Pricing Model with Stochastic Consumption and Investment Opportunities." Journal of Financial Economics (September 1979): 265-96.

Brewer, H. L. "Investor Benefits from Corporate International Diversification." Journal of Financial and Quantitative Analysis (March 1981): 113-26.

Brown, B. C., and J. T. Brandi. "Security Price Reactions to Changes in Foreign Currency Translation Standards." Journal of Accounting, Auditing & Finance (Summer 1986): 185-201.

Burns, J. M. Accounting Standards and International Finance. Washington, D.C.: American Enterprise Institute for Public Policy Research, 1976.

Business International Corporation, New Directions in Managing Currency Risk: Changing Corporate Strategies and Systems under FAS No. 52. New York, New York: Business International Corporation, 1982.

Chen, N., R. Roll, and S. Ross. "Economic Forces and the Stock Market." Journal of Business (July 1986): 383-403.

Choi, J. J. "Consumption Basket, Exchange Risk, and Asset Demand." Journal of Financial and Quantitative Analysis (September 1984): 287-97.

Choi, S. "Differential Information Content of Publicly Announced Earnings: Theoretical and Empirical Analysis." Ph.D. Dissertation, University of Iowa: 1985.

Collins, D.W., and S.P. Kothari. "A Theoretical and Empirical Analysis of the Determinants of Earnings Response Coefficients." Working Paper, University of Iowa: November 1987.

Dukes, R. An Empirical Investigation of the Effects of Statement of Financial Accounting Standards No. 8 on Security Return Behavior. Stamford, Connecticut: FASB, 1978.

Eaker, M. R. "The Numeraire Problem and Foreign Exchange Risk." Journal of Finance (May 1981): 419-26.

_____, and D. M. Grant. "Cross-Hedging Foreign Currency Risk." Journal of International Money and Finance (March 1987): 85-105.

Errunza, V. R., and L. W. Senbet. "The Effects of International Operations on the Market Value of the Firm: Theory and Evidence." Journal of Finance (May 1981): 401-18.

_____, and _____. "International Corporate Diversification, Market Valuation, and Size-Adjusted Evidence." Journal of Finance (July 1984): 727-43.

Ettredge, M., P. Shane, and D. Smith. "Audit Firm Size and the Association between Reported Earnings and Security Returns." Auditing: A Journal of Practice and Theory (Spring 1988): 29-42.

Eun, C. S. "Global Purchasing Power View of Exchange Risk." Journal of Financial and Quantitative Analysis (December 1981): 639-50.

Evans, T. G., W. R. Folks, and M. Jilling. The Impact of Statement of Financial Accounting Standards No. 8 on the Foreign Exchange Risk Management Practices of American Multinationals: An Economic Impact Study. Stamford, Connecticut: FASB, November 1978.

Fama, E. F., and J. D. MacBeth. "Risk, Return, and Equilibrium: Empirical Tests." Journal of Political Economy (1973): 607-36.

Fatemi, A. M. "Shareholder Benefits from Corporate International Diversification." Journal of Finance (December 1984): 1325-44.

Frenkel, J. A. "Flexible Exchange Rates, Prices, and the Role of 'News': Lessons from the 1970s." Journal of Political Economy (August 1981): 665-705.

Gay, G. D., and S. Manaster. "Hedging against Commodity Price Inflation: Stocks and Bills as Substitutes for Futures Contracts." Journal of Business (July 1982): 317-43.

Glick, R. "Market Neutrality Conditions and Valuation of a Foreign Affiliate." Journal of Business Finance & Accounting (Summer 1986): 239-49.

Grauer, F. L. A., R. H. Litzenberger, and R. Stehle. "Sharing Rules and Equilibrium in an International Capital Market under Uncertainty." Journal of Financial Economics (June 1976): 233-56.

Griffin, P. A. "Foreign Exchange Gains and Losses: Impacts on Reported Earnings." Abacus (June 1982): 50-69.

_____ . "Management Preferences for FASB Statement No. 52: Predictive Ability Results." Abacus (October 1983): 130-38.

Harris, T. S. "Consequences of Economic Concepts of Foreign Exchange for Financial Accounting." Ph.D. Dissertation, University of Washington: 1983.

Haw, I., S. Lilien, and V. Pastena. "The Impact of SFAS No. 52. " Working Paper, Baruch College: May 1986.

Hodder, J. E. "Exposure to Exchange-Rate Movements." Journal of International Economics (August 1982): 375-86.

Howard, C. T., and L. J. D'Antonio. "A Risk-Return Measure of Hedging Effectiveness." Journal of Financial and Quantitative Analysis (March 1984): 101-12.

Ijiri, Y. "Foreign Currency Accounting and Its Transition." in Herring, R. ed. Managing Foreign Risk. New York, New York: Cambridge University Press, 1983: 181-212.

Jacquillant, B., and B. H. Solnik. "Multinationals Are Poor Tools for Diversification." Journal of Portfolio Management (Winter 1978): 8-12.

Kelly, L. "Corporate Management Lobbying on FAS No. 8: Some Further Evidence." Journal of Accounting Research (Autumn 1985): 619-632.

_____ , and D. Lee. "An Empirical Analysis of the Cumulative Adjustment Account for Foreign Currency Translation Gains and Losses." Working Paper, University of Washington: June 1987.

Long, J. B. "Stock Prices, Inflation, and the Term Structure of Interest Rates." Journal of Financial Economics (July 1974): 131-70.

Maddala, G.S. Econometrics. New York, New York: McGraw-Hill Book Company, 1977.

Makin, J. H. "Measuring the Impact of Floating Exchange Rates and FASB Statement No. 8 on Cost of Capital for Multinationals." in Economic Consequences of Financial Accounting Standards Selected Papers, Stamford, Connecticut: FASB, July 1978: 41-69.

Merton, R. C. "An Intertemporal Capital Asset Pricing Model." Econometrica (September 1973): 867-87.

Miller, J., and B. Pras. "The Effects of Multinastional and Export Diversification on the Profit Stability of U.S. Corporations." Southern Economic Journal, (July 1980): 792-805.

Rayburn, J. "The Association of Operating Cash Flow and Accruals with Security Returns." Journal of Accounting Research (Supplement 1986): 112-33.

Revisine, L. "The Rationale Underlying the Functional Currency Choice." Accounting Review (July 1984): 505-14.

Schipper, K., and R. Thompson. "Common Stocks as Hedges against Shifts in the Consumption or Investment Opportunity Set." Journal of Business (April 1981): 305-28.

Shapiro, A. C. Multinational Financial Management. Boston, MA: Allyn & Bacon, 1982.

Stopford, J. The World Directory of Multinational Enterprises 1982-83. Detroit, Michigan: Gale Research Company, 1982.

Stulz, R. M. "Pricing Capital Assets in an International Setting: An Introduction." Journal of International Business Studies (Winter 1984): 55-73.

Thompson, R. "Comment on Standard Setting and Security Returns: A Time Series Analysis of FAS No. 8 Events." Contemporary Accounting Research (Fall 1986): 274-50.

Tse, S. "The Assessment of the Information Content of Contemporaneous Events: The Case of the FASB's Standard Formulation for Foreign Currency Translation." Working Paper, University of Florida: August 1988.

Wilson, G. P. "The Relative Information Content of Accruals and Cash Flows: Combined Evidence at the Earnings Announcement and Annual Report Date." Journal of Accounting Research (Supplement 1986): 165-200.

Ziebart, D. A., and D. H. Kim. "An Examination of the Market Reactions Associated with SFAS No. 8 and SFAS No. 52." Accounting Review (April 1987): 343-57.

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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August 1989

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